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Q.10:- Define Price Elasticity of Demand?

Ans:- Price elasticity of demand is a measurement of percentage change in quantity demand due to percentage change in price of that commodity or in other words the responsiveness of quantity demanded due to change in price is termed as price elasticity of demand. It expresses the relationship between quantity demanded of a commodity and its price. It can be written as:

Price elasticity of demand =percentage change in quantity demanded

Percentage change in price

Or ,in symbolic terms,

$$\mathbf{EP}=\frac{\Delta Q}{\Delta P}\times\frac{P}{Q}$$

Where, Ep stands for price elasticity

q stands for quantity

Δq stands for change in quantity demanded

p stands for price.

Δp stands for change in price

The elasticity of demand is always negative, although by convention it is taken to be positive by ignoring the negative sign. It is negative because change in quantity demanded is in opposite direction to the change in price. A change in demand is not always proportionate to the change in price. A small change in price may lead to a great change in demand. In that case, the demand is said to be elastic. If, on the other hand, even a big change in price is followed only by a small change in demand, it is said to be a case of inelastic demand. The elastic demand is said to be greater than unity and inelastic demand is less than unity. The elasticity of demand is unity (or one) when the percentage change in price results in an exactly compensating percentage change in the quantity demanded.

Income elasticity of demand: when change in quantity demanded is measured with respect to change in income of the buyers, it is called income elasticity of demand. Thus when income goes up , the demand may rise and vice versa. Therefore the term income elasticity of demand is used to estimate the degree of change in demand for a commodity with a given change in the income of the consumer,

Thus income elasticity of demand is equal to. = Percentage change in Demand

Percentage change in income

The formula is mathematically presented as under:

$$\mathbf{EP}=\frac{\Delta Q}{\Delta Y}\times\frac{Y}{Q}$$

Here Δ stands for change

q Stands for original quantity demanded.

y stands for original income.

Δq stands for change in quantity demanded.

Δy stands for change in income.

If e_y is > 1, demand is said to be more income elastic. If e_y is < 1 demand , is said to be less income elastic. When $e_y = 1$ it means changes in demand are in the same proportion as the changes in income or income elasticity is unity. If $e_y = 0$ it means changes in income do not cause any change In the demand I,e the good has an income inelastic demand. The Income elasticity of demand of inferior goods is negative.

1. **Cross elasticity of demand:** this elasticity of demand is related to the changes that take place in the price of one commodity and the demand of other commodity. This elasticity signifies the rate of change in demand of one commodity as a result of change in the price of another commodity; this elasticity is based on substitution effect. To be more precise, Cross elasticity of demand may be defined as the ratio of proportionate change in demand of one commodity (say x) to the proportionate change in the price of another commodity (say Y). it can be measured by using the following formula.

$$\text{Cross elasticity} = \frac{\text{\% Proportionate change in demand for X}}{\text{\% Proportionate change in price of y}}$$

$$= \Delta Qx/\Delta P_Y \times P_y/Qx$$

Here, Qx = original quantity of commodity x ,

ΔQx = change in the quantity of commodity x

Py = Original price of commodity

ΔPy , = Change in the price of commodity y

Factors Determining Elasticity of Demand

There are several factors which determine the elasticity of demand.

(i)For necessaries and conventional necessaries the demand is inelastic or less elastic- We have to buy these commodities whatever be the price. A change in price, therefore, does not matter so far as the demand for such commodities is concerned. Salt is one such thing and wheat another. But in a poor country like India-even the demand for such things is somewhat elastic. The change in the price of wheat may be immaterial for upper and middle classes, but its consumption will certainly increase among the poor when its price falls.

(ii) Demand for luxuries is elastic- When the price of luxuries falls; people buy much more of them, and when the price raises the demand contracts. But luxury is a relative term. A high-

priced luxury of the poor man is a low-priced necessary for the rich. For the same thing demand of the lower classes may be elastic and that of the rich classes less elastic.

(ii **Availability of Substitutes:-**Demand for those commodities, which have substitutes available is more elastic. The reason being that when the price of the commodity falls in relation to its substitute, the consumers will demand more and more of it hence demand increases.Likewise ,commodities which have no substitutes like cigarettes, liquor etc have inelastic demand .

(viii) **Proportion of total expenditure allocated for the commodity**- If the proportion of total expenditure devoted to a commodity is small, the demand for it tends to be inelastic. For example, the percentage of budget devoted by a typical household to soap, salt and ink is quite small and consequently the demand for these goods is relatively inelastic.

Nature of commodity:- Ordinarily ,necessities like salt, match boxes, text books, seasonal vegetables etc has in elastic demand .Luxuries ,like air conditioners, costly furniture etc have elastic demand. The reason being that change in their prices has a great effect on their demand. Complementary goods like car and petrol, pen and ink etc. Have ordinarily inelastic demand

(ix) **Habit and fashion**- The demand for those goods which are habitually consumed or which are in fashion is inelastic. The reason is that such commodities become more or less a necessity for the consumer

(x) **Future expectations about price changes**-The future expectations about the price of any commodity also influence the elasticity of demand for it. For instance, if the price of any commodity is expected to rise in future, then a small decrease in its price will produce a considerable increase in its price.

(xi) **The state of joint demand**-In case of commodities having joint demand, the elasticity of demand for a good depends upon the elasticity of demand for other jointly-produced goods. For example, if the demand for cars increases, the demand for petrol will also increase with the same rapidity as the demand for cars does.

Q. Describe the measurement of price elasticity of Demand?.

Ans:-By measuring price elasticity of demand we know whether demand for a commodity is (i) Unitary elastic (ii) Greater than unitary elastic or (iii) less than unitary elastic. There are three different methods of measurement of price elasticity of demand they are:

- Total expenditure method.
- Proportionate method and
- Geometric method.

Q.12:- Explain expenditure method of measuring price Elasticity of Demand? Or outlay

Ans:-This method was evolved by Marshall and is also known as total outlay method of measurement of price elasticity of demand under this method. We measure price elasticity of demand by examining, the changes in total expenditure due to change in the price of the commodity. Total expenditure is equal to price multiplied by quantity demanded of a commodity i.e. Total expenditure= Price × Quantity demanded. (P x Q). Total expenditure method does not give us any exact value of elasticity. it only says whether **Ed>1, Ed<1 or Ed=1**

According to this method elasticity of demand is of three types which are as under:

- **Unitary Elastic demand (Ed=1):-** if rise or fall in price have no effect on total expenditure, elasticity of demand is said to be unitary elastic (Ed=1)
- **Greater than Unitary elastic (Ed>1):-** If with the fall in price of a commodity total expenditure increases and with the rise in price total expenditure falls. Then demand for commodity is said to be elastic or greater than unitary i.e.; Ed>1.
- **Less than Unitary Elastic (Ed<1):-** If with the fall in price total expenditure falls and with the rise in price total expenditure rises. Elasticity of demand is said to be less than unity i.e. Ed<1.

The three cases are also explained in the following schedule:

Schedule showing different elasticities of demand according to Total Expenditure method.

Three causes in the schedule

Price (in Rs) P_x	Quantity demanded (Q_x units)	Total Expenditure $P_x . Q_x$	Elasticity of demand
4	5	20	
6	3	18	Ed>1
4	5	20	
5	4	20	Ed=1
4	5	20	
8	4	32	Ed<1

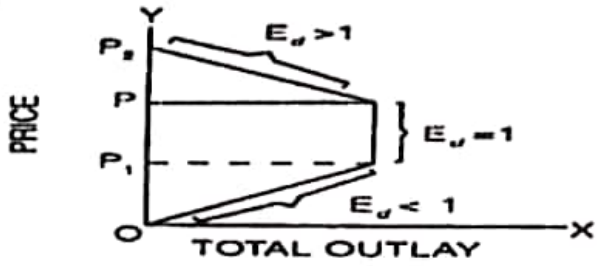
1. It is clear from above schedule that when prices of the commodity is Rs 4,the total expenditure is Rs. 20.when price increases from Rs 4 to Rs 6, total expenditure decreases from 20 to 18 and when price falls total expenditure increases. Hence elasticity of demand is greater than one. I.e. Ed>1.

1. When total expenditure remains same with the increase in price from Rs. 4 to Rs 5, elasticity of demand is equal to be unitary elastic. The table shows that when the price of the commodity is Rs. 4, the total expenditure is Rs. 20. When the price of the commodity increases to Rs. 5. The total expenditure remains Rs. 20. Thus change in price has no effect on total expenditure. therefore, elasticity of demand is unitary.

2. When price rises from Rs. 4 to Rs 8, total expenditure increases from 20 to 32, elasticity of demand is less than one i.e.; Ed<1

Total outlay method of measuring elasticity of demand is expressed diagrammatically as.

In the figure price is shown on X axies and total expenditure on Y axies. TE curve is total expenditure curve. TB shows inverse relationship between Price and total expenditure. It is a situation when Ed>1.EC shows positive relationship between price and total Expenditure. It is a situation when. Ed<1. BC shows total expenditure as constant in response to Increase or decrease in price. It is a situation when Ed=1.



Q. Explain Percentage (or) Proportionate method of measuring of price elasticity of demand?

Ans. This method was also suggested by Marshall. According to this method elasticity of demand is measured by the percentage or proportionate change in quantity demanded due to percentage or proportionate change in price. The following formula is used to measure the elasticity of demand.

Price elasticity of Demand= $\frac{\text{Percentage change in Demand}}{\text{Percentage change in price}}$

The formula is mathematically presented as under:

$$Ed = \frac{\Delta q}{\Delta P} \times \frac{p}{q}$$

Here Δ stands for change

q Stands for original quantity demanded.

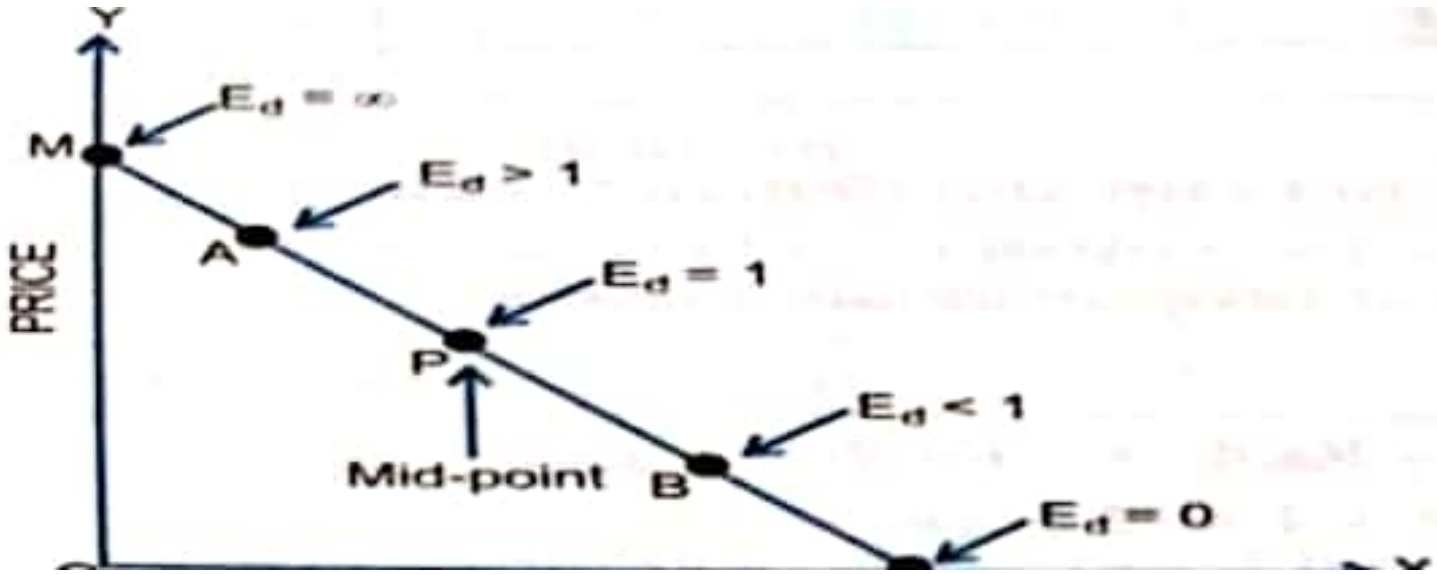
P stands for original price.

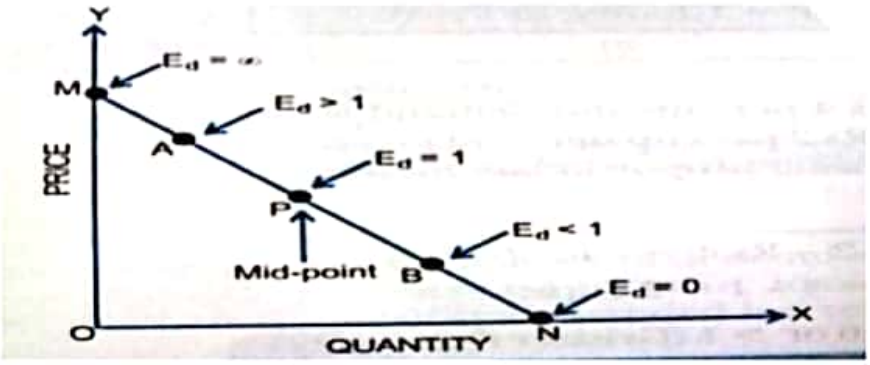
It is further explained by examples:

Hence demand is in elastic or less than unitary elastic

3 Point Method or Geometric method of measurement of Elasticity of demand: - Price elasticity of demand is also measured geometrically. The method is also known as point method. According to this method elasticity of demand on each point on the straight line demand curve shall be different. According to this method elasticity of demand on each point is measured with the help of following formula:

Elasticity of demand (Ed) = Lower segment of demand curve





This is explained with the help of given diagram. Here along x-axis we measure quantity demand and along y-axis we measure price. MN is the straight line demand curve and we have to measure Ed on different points on demand curve MN. It has following cases:

- Elasticity of demand at mid point (P) of demand curve is equal to 1 i.e. (Ed=PN/MP=1) because lower segment is equal to upper segment of demand curve.
- Elasticity of demand at point M is infinity because lower segment is MN and upper segment is zero. Hence Ed =MN/o =∞

Elasticity of demand at point N is equal to 0 because lower segment is zero and upper segment is equal to NM. Hence ED= 0/NM= 0.

Elasticity of demand between M and P is greater than one say at point A because lower segment is greater than upper segment. E.g. at A. Ed = $\frac{AN}{AM} > 1$ (AN > AM)

- Elasticity of demand at any point between P and N is less than one say at Point B because lower segment is less than upper segment. E.g. Ed=BN/BM < because BN >BM.

Q.1:- Give the meaning of Supply? Distinguish between supply and stock.

Ans: - Supply refers to the quantity of a commodity offered for sale considering different possible prices at a given point of time. According to Thomas, "The supply of goods is the quantity offered for sale in a given market at a given time at various prices".

Stock of a commodity refers to the total quantity of a commodity available in the market at any given time with the sellers. Supply refers to that part of the stock which the seller is prepared to sell at a given price and at a given time.

Q. What do you mean by supply function?

Ans. Supply function describes the functional relationship between supply of a commodity and other determinants of supply.

The important determinants of supply can be grouped together in a supply function as follows:

$S_N = f(P_N, P_R, F, T, G)$

Determinants of supply are as:

1) price of the commodity (P_N)
2) Price of related goods (P_R)
3) Price of the factors of production (F)

4) technical knowhow (T) and
5) Goals or general objectives of the producer.

Q.2:- What are the factors which determine the supply of a commodity?

Ans: - Some of the important factors which determine the supply of a commodity as under:

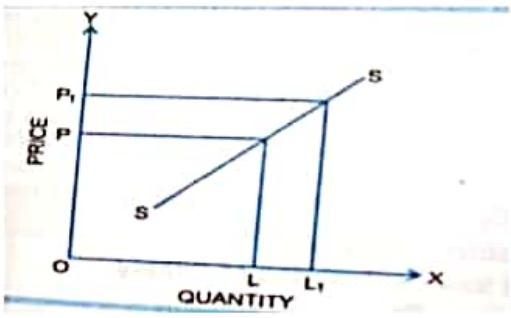
- **Price of commodity:-**There is a direct relationship between price of a commodity and its quantity supplied. Generally, higher the price of a commodity higher will be its quantity supplied and vice versa.
- **Price of related goods: -** The supply of a good depends upon the price of other goods. An increase in the price of other goods makes them more profitable for the firm. They will increase its supply. On the other hand supply of the good whose price has not changed may decrease.
- **Number of firms: -** Market supply of a commodity also depends upon the number of firms in the market. Increase in the number of firms implies increase in the market supply.
- **Price of factors of production:-**Supply of commodity is also affected by the price of factors used for the production of the commodity. If the factor price decreases, cost of production also reduces accordingly supply increases.
- **Expected Change in future price:-**If the producer expects price of the commodity to rise in near future, current supply of the commodity will decrease and same is true for vice versa.

Q. What is supply schedule? What are its types?

Ans. Supply schedule is a tabular presentation of various quantities of a commodity offered for sale corresponding to different possible prices. It has two aspects.

1. **Individual supply schedule:-**Individual supply schedule refers to supply schedule of an individual firm in the market. It shows supply response of a particular firm in the market An individual supply schedule is given as under:-

P_x (Rs)	S_x (Units)
10	100
11	200
12	300



It is clear from the table that as price rises supply extends. At Rs 10 the producer is willing to sell 100 units and when price rises to Rs 11, 12, quantity supplied extends to 200, 300 units respectively.

2) Market supply schedule:-It refers to supply schedule of all the firms in the market producing a particular commodity. It is horizontal summation of individual supply schedules in the market .Assuming that there are only two firms A & B in the market then there market supply schedule can be given as under:-

Table 2. Market Supply Schedule

Price of Ice cream (Rs)	Supply by Firm 'A' (Units)	Supply by Firm 'B' (Units)	Market Supply (Units)
5	0	0	0
10	10	5	10 + 5 = 15
15	20	10	20 + 10 = 30
20	30	20	30 + 20 = 50

From the above supply schedule it is clear that when price is Rs 5 firms are not willing to sell any unit hence market supply is 0.As price rises to 10 firm A supplies 10 units and firm B supplies 5 units. So the market supply is 15 units. Similarly when price rises further market supply also rises.

Q. What is Supply curve?

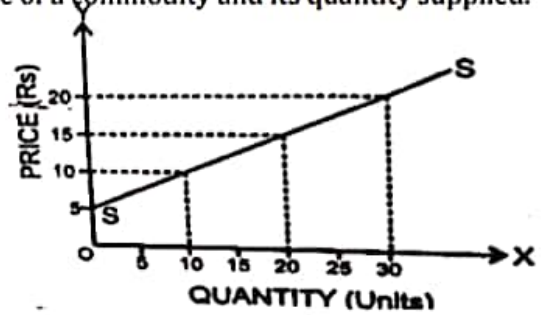
Supply curve is a graphic presentation of supply schedule, indicating positive relationship between price of a commodity and its quantity supplied. Like supply schedule, it has two aspects:

1) Individual supply curve and
2) Market supply curve.

- **Individual supply curve**

It is a graphic presentation of supply schedule of an individual firm in the market. Sloping upwards, it indicates positive relationship between price of a commodity and its quantity supplied.

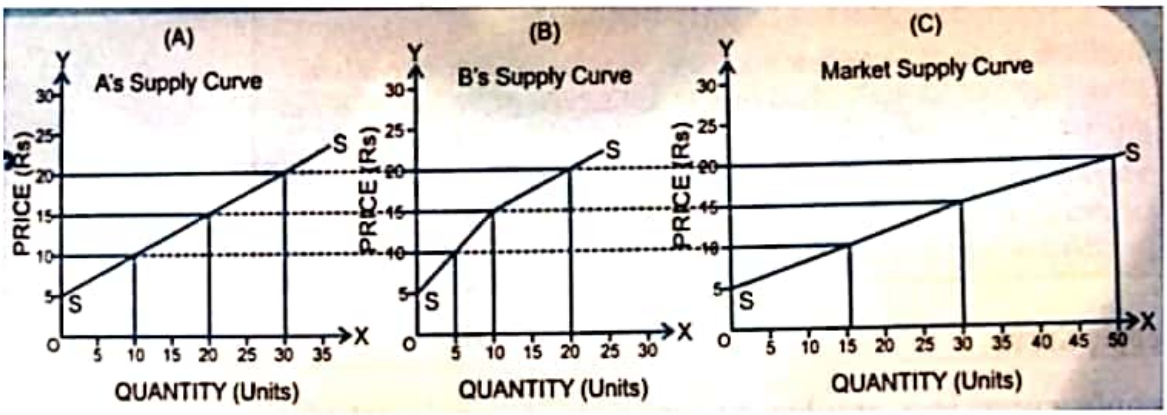
Price	Quantity
10	10
15	20



The diagram is drawn on the basis of the above individual supply schedule. In fig 1, SS is the supply curve .It has positive slope meaning thereby that as price rises, the supply extends. It is evident from this figure that, if price falls to Rs 5 or less than that, the seller will not be prepared to sell any units

B) Market Supply Curve:-

Market supply curve is a graphic presentation of market supply schedule. It is supply curve of the industry as a whole. It is derived by way of horizontal summation of supply curves of all the firms in the industry.



Market supply curve is explained in above diagram where we assume that there are only two firms producing a product in the market. When price is Rs 10 firm A supplies 10 units, firm B supplies 5 units and firm C supplies 15 units. Hence market supply is 10+5=15 units. When price rises to Rs 15 firm A supplies 20 units and Firm B supplies 10 units. Hence market supply is 20+10=30. SS is market supply curve which is derived by the summation of S_1S_1 and S_2S_2 which is supply of firm A and firm B respectively.

Q. Distinguish between joint supply and composite supply?

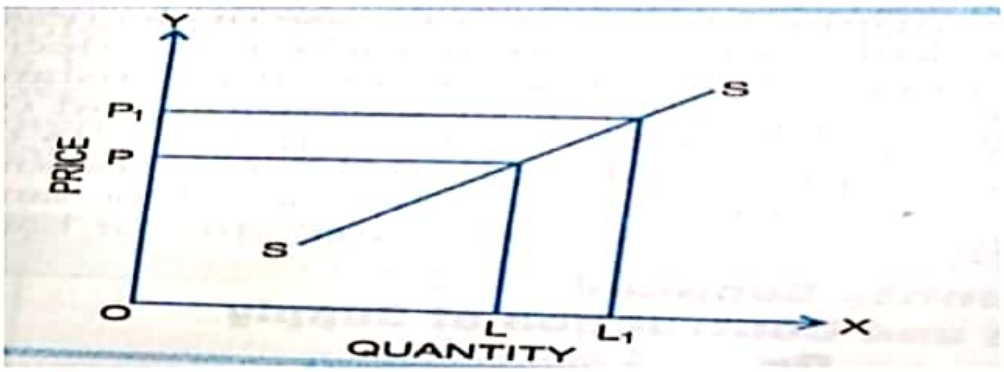
Ans. Joint supply: - when two or more than two commodities are supplied at a particular time that is called joint supply, e.g. wheat and husk bones and leather etc.

Composite supply: - When there are a number of sources of the supply of a single commodity that is called composite supply. E.g. Light can be supplied by electricity, gas, oil, torch, candle etc.

Q.3:- State and explain the law of supply?

Ans: - Law of supply establishes the direct relationship between price and quantity of good supplied. According to this law, supply of the commodity will increase with increase in price and decrease with decrease in price, other things remaining the same. In other words price of the commodity and its supply move in the same direction. Law of supply is explained with the help of following supply schedule

The law of supply may also be explained with the help of supply curve as under:



In the above figure quantity supplied is measured along X-axis and price along Y-axis. SS is supply curve which slopes upwards. It shows extension in quantity supplied in response to price. Thus quantity supplied extends from OL to OL_1 as price rises from OP to OP_1.

Q.4:- What are the assumptions of law of supply?

Ans: - Assumptions of law of supply are as under:-

1. There is no change in price of the factors of production.

2. There is no change in technique of production.

3. There is no change in the number of firms.

4. There is no change in prices of related goods.

Q.5- What are the exceptions to the law of supply?

Ans: - Law of supply does not hold good in case of following situations:

1) Law of supply does not apply strictly to agricultural commodities whose supply is governed by natural factors.

2) Supply of goods having social distinction will remain limited even if their price may rise high.

3) Sellers may be willing to sell more units of perishable goods although their price may be falling.

Q.6:- What do you mean by extension and contraction in supply?

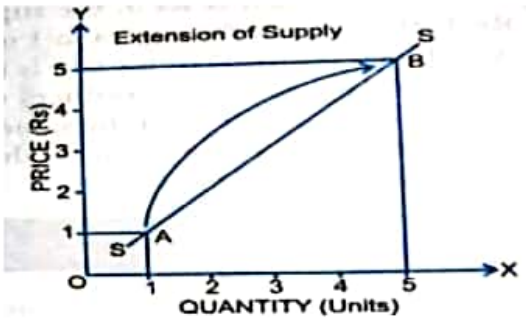
Ans: - When change in quantity supplied of a commodity is caused by change in its price, it is called extension or contraction of supply or movement along the supply curve.

- **Extension of supply: -** Other things remains the same, when quantity supplied of a commodity rises due to rise in price it is called extension of supply. It is shown in figure and table.

  Success is like a train. It has several compartments: Hard work, Focus, Luck, etc. but leading all those is the engine of confidence. So keep it fit.

Table shows extension of supply

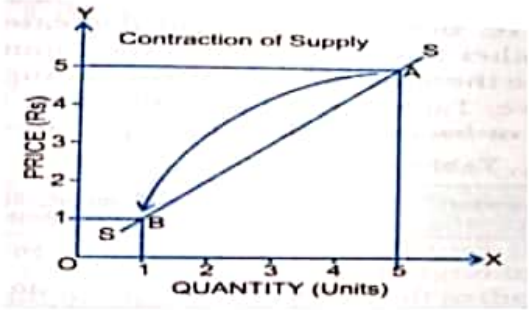
Price of X (Rs)	Quantity supplied (Units)
1	1
5	5



In the above table it is shown that when price rises from Rs. 1 to Rs. 5 quantity supplied extends from 1 to 5 units. In the figure also when price rises from 01 to 05 quantity supplied extends from 1 to 5. Movement from A to B shows extension in supply.

2. Contraction of supply: - Other things remaining same when quantity supplied of the commodity falls because of fall in price it is called contraction of supply. It is explained with the help of following table and figure:

Price of X (Rs)	Quantity supplied (Units)
5	10
1	5



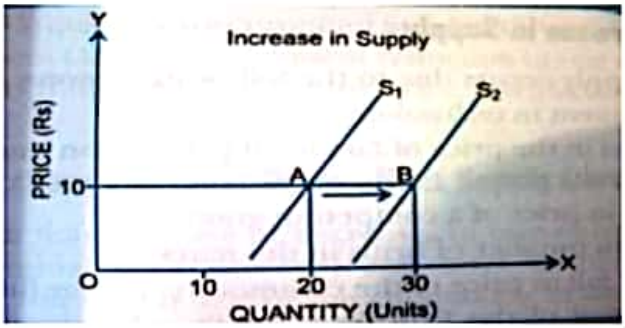
The above table shows that when price falls from Rs 5 to Rs. 1, quantity supplied contracts from 5 to 1 units. The figure also shows contraction of quantity supplied from 5 to 1 as price falls from 05 to 01. Movement from A to B along supply curve SS shows contraction of supply.

Q. What do you mean by increase or decrease in supply?

Ans:-Increase In supply: - When quantity supplied of a commodity increases due to the factors other than price it is called increase in supply. In this case supply curve shifts to right.

1. **More quantity is supplied at the same price:-**This is explained with the help of following diagram and table:-

Px (Rs)	Quantity (supplied (units)
10	**20**
10	**30**



In the above table price remains same i.e. Rs 10 but quantity supplied increases from 20 to 30 units. In the figure also price remains same (10) but quantity supplied increases from 20

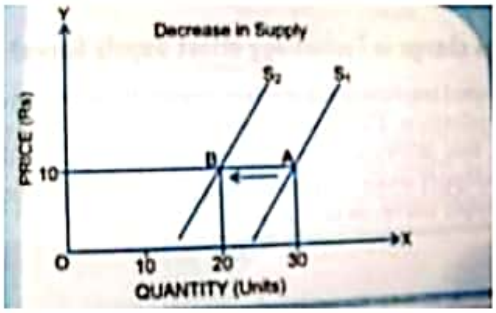
to 30 shift of supply curve from SS to S1S1 shows increase in supply

Q10. What do you mean by decrease in supply?

Ans. When quantity supplied of a commodity falls because of factors other than price it is called decrease in supply. It is also called shift in supply curve because in this case supply curve shifts to left.

1 .Less quantity is supplied at same prices:-In this caseprice remains same but quantity supplied decreases. This is shown in the following diagram and table.

Same quantity is supplied at less price:-	Quantity supplied (Units)
10	30
10	20



Here in above table quantity supplied decreases from 30 to 20 units but price remains same. In the figure also price remains 10 but quantity supplied decreases from A to B supply curve shifts backwards to left from S_1S_1 to S_2S_2.

Q .What is price elasticity of supply?

Ans. Price elasticity of supply is a measurement of the percentage change in quantity supplied of a commodity in response to some percentage change in its price. In other words we can say that price elasticity of supply is proportionate change in quantity supplied due to proportionate change in price of the commodity.

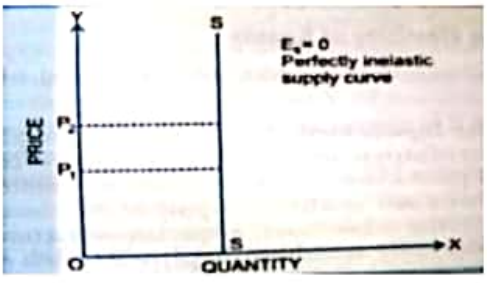
Q. Bring out the difference between contraction of supply and decrease in supply?

Ans. Fall in quantity supplied due to fall in price is called contraction in supply; whereas fall in quantity supplied due to factors other than the price is called decrease in supply.

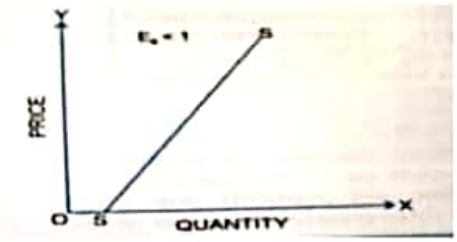
Q. What are the degrees of elasticity of supply?

Ans. There are five types of elasticity of supply which are as:

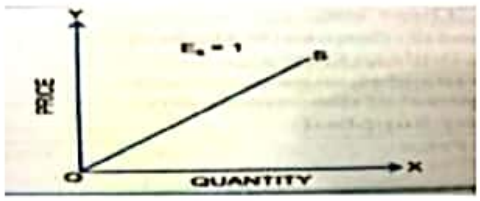
1) **Perfectly inelastic supply.** Supply of a commodity will be said to be perfectly inelastic, if the quantity offered for sale does not change with a change in price. Supply of rare books, stamps etc. is of this type.



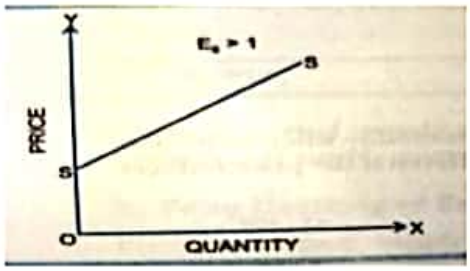
Inelastic or Less than unit elastic. Supply of a commodity is said to be inelastic if the percentage change in quantity supplied is less than the the percentage change in price.



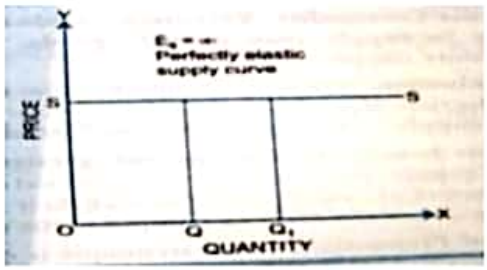
2) **Unit elastic.** Supply of a commodity is said to be unit elastic if the percentage change in quantity supplied equals the percentage change in the price.



3) **More than unit elastic.** Supply of a commodity will be said to be more than unit elastic if the percentage change in quantity supplied exceeds the percentage change in price.



4) **Perfectly elastic supply.** Supply of a commodity is said to be perfectly elastic when the supply of it may increase or decrease to any extent irrespective of any change in its price.



Q. How price elasticity supply is measured?

Ans. There are two well known methods of measuring price elasticity of supply. These are.

- **Proportionate method and Geometric method.**
- **Proportionate method of measurement of elasticity of supply:-**According to this method elasticity of supply (Es) is the ratio between 'percentage change in quantity supplied "and 'percentage change in price' of the commodity.

$$Es = \frac{\text{Percentage change in quantity Supplied}}{\text{Percentage change in price.}}$$

Symbolically

$$\frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Where :

Δ represents change.

P represents' price and

Q represents quantity supplied.

Example:-A producer offers to sell 400 units of commodity when its price is Rs 10 per unit while offers only 200 units if the price falls to Rs 5 per unit. Find elasticity of supply?

Sol. Q=400

q=200

P=10

P=5

Es= Δq/Δp × P/Q

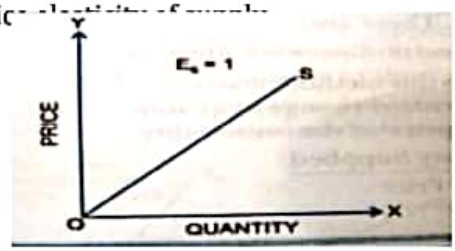
200/5 ×10/400 =1

Es=1 therefore elasticity of supply is equal to 1.

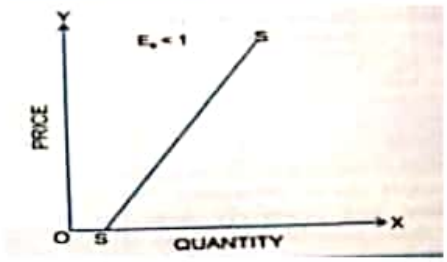
Geometric method of measurement of price elasticity of supply (Or) Degrees of price elasticity of supply:-

Geometrically, elasticity of supply depends upon the nature of supply curve .Assuming the supply curve to be a straight line we may have following situations of pric[illegible]

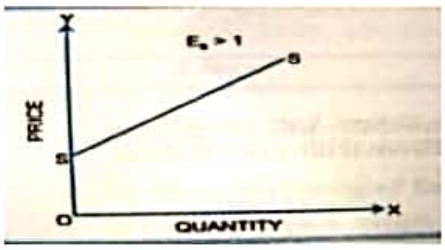
1- When the straight line, positively sloping supply curve starts from origin. Its elasticity of supply is equal to one .This is shown in figure (1)



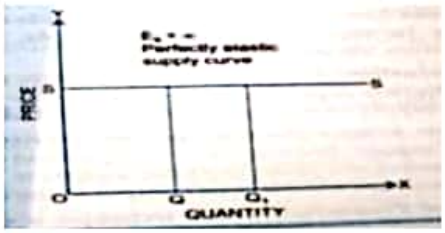
2-When the straight line supply curve starts from x-axis, elasticity of supply is less than one (Es<1)
This is shown in figure (2)



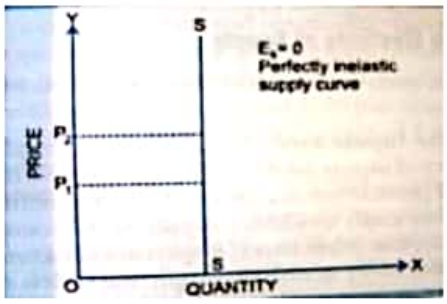
3-When the straight line supply curve starts from y-axis its elasticity of supply is greater than one (es>1) .This is shown in figure (3)



4-When the straight line supply curve is parallel to x-axis. Its elasticity of supply is equal to infinity .As shown in figure (4)



5-When the straight line supply curve is parallel to Y-axis .Its elasticity of supply is equal to zero. As sown in fig (5) .



Determination of Price in a Free Market

In sections 3.2 and 3.4, we have explained the laws of demand and supply and how demand and supply behave in response to the change in price and other determinants. In this section, we explain how demand and supply strike a balance, how market attains **equilibrium**, and how **equilibrium price** is determined in a free market. A **free market** is one in which market forces of demand and supply are free to take their own course and there is no outside control on price, demand and supply.

The Concept of Market Equilibrium

In physical sense, the term equilibrium means the "state of rest". In general sense, it means balance in opposite forces. In the context of market analysis, ***equilibrium refers to a state of market in which quantity demanded of a commodity equals the quantity supplied of the commodity.*** The equality of demand and supply produces an ***equilibrium price.*** The **equilibrium price** is the price at which quantity demanded of a commodity equals its quantity supplied. That is, at equilibrium price, demand and supply are in equilibrium. Equilibrium price is also called ***market-clearing price.*** Market is cleared in the sense that there is no unsold stock and no unsupplied demand.

Determination of Market Price

Equilibrium price of a commodity in a free market is determined by the market forces of demand and supply. In order to analyse how equilibrium price is determined, we need to integrate the demand and supply curves. For this purpose, let us use the example of shirts. Let us suppose that the market demand and supply schedules for shirts are given as shown in Table 3.3.

As the table shows, there is only one price of shirts (Rs 300) at which the market is in equilibrium: quantity demanded equals the quantity supplied at 40 thousand shirts. At all other prices, the shirt market is in ***disequilibrium***—the state of imbalance between supply and demand. When market is in the state of disequilibrium, either demand exceeds supply or supply exceeds demand. As the table shows, at all prices below Rs 300, demand exceeds supply showing *shortage* of shirts in the market. Likewise, at all prices above Rs 300, supply exceeds demand showing *excess supply*.

Table 3.3 Monthly Demand and Supply Schedules for Shirts

Price per Shirt (Rs)	Demand ('000 shirts)	Supply ('000 shirts)	Market Position	Effect on Price
100	80	10	Shortage	Rise
200	55	28	Shortage	Rise
300	40	40	**Equilibrium**	**Stable**
400	28	50	Surplus	Fall
500	20	55	Surplus	Fall
600	15	60	Surplu	Fall

In a free market, disequilibrium itself creates the condition for equilibrium. When there is excess supply, it forces downward adjustments in the price and quantity supplied. When there is excess demand, it forces upward adjustments in the price and quantity demanded. The process of downward and upward adjustments in price and quantity continues till the price reaches Rs 300 and quantities supplied and demanded balance at 40 thousand shirts. This process is automatic. Let us now look into the process of price and quantity adjustments called 'market mechanism'.

Market mechanism: How market brings about balance

Market mechanism is a process of interaction between the market forces of demand and supply to determine equilibrium price. To understand how it works, let the price of shirts be initially set at Rs 100. At this price, the quantity demanded exceeds the quantity supplied by 70 thousand shirts. The shortage will force buyers to bid higher price to buy the desired number of shirts. This gives sellers an opportunity to raise the price. Increase in price enhances the profit margin. This induces firms to produce and sell more in order to maximize their profits. This trend continues till price rises to Rs 300. As Table 3.3 shows, at price Rs 300, the buyers are willing to buy 40 thousand shirts. This is exactly the number of shirts that sellers would like to sell at this price. At this price, there is neither shortage nor excess supply of shirts in the market. Therefore, Rs 300 is the equilibrium price. The market is, therefore, in equilibrium.

Similarly, at all prices above Rs 300, supply exceeds demand showing excess supply of shirts in the market. The excess supply forces the competing sellers to cut down the price. Some firms find low price unprofitable and go out of market and some cutdown their production. Therefore, supply of shirts goes down. On the other hand, fall in price invites more customers. This process continues until price of shirts falls to Rs 300. At this price, demand and supply are in balance and market is in equilibrium. Therefore, price at Rs 300 per shirt is equilibrium price.

Graphical Illustration of Price Determination

The determination of equilibrium price is illustrated graphically in Fig. 3.11. The demand curve *DD'* and the supply curve *SS'* have been obtained by plotting the demand and supply schedules, respectively, (given in Table 3.3) on the price and quantity axes.

As Fig. 3.11 shows, demand and supply curves intersect at point *E* determining the **equilibrium price** at Rs 300. At this price, the quantity demanded (40 thousand shirts) equals the quantity supplied. Thus, the equilibrium price is Rs 300 and equilibrium quantity is 40 thousand shirts. The quilibrium condition is not fulfilled at any other point on the demand and supply curves. Therefore, if price is set at any price other than Rs 300, there would be either excess supply or shortage of shirts in the market.

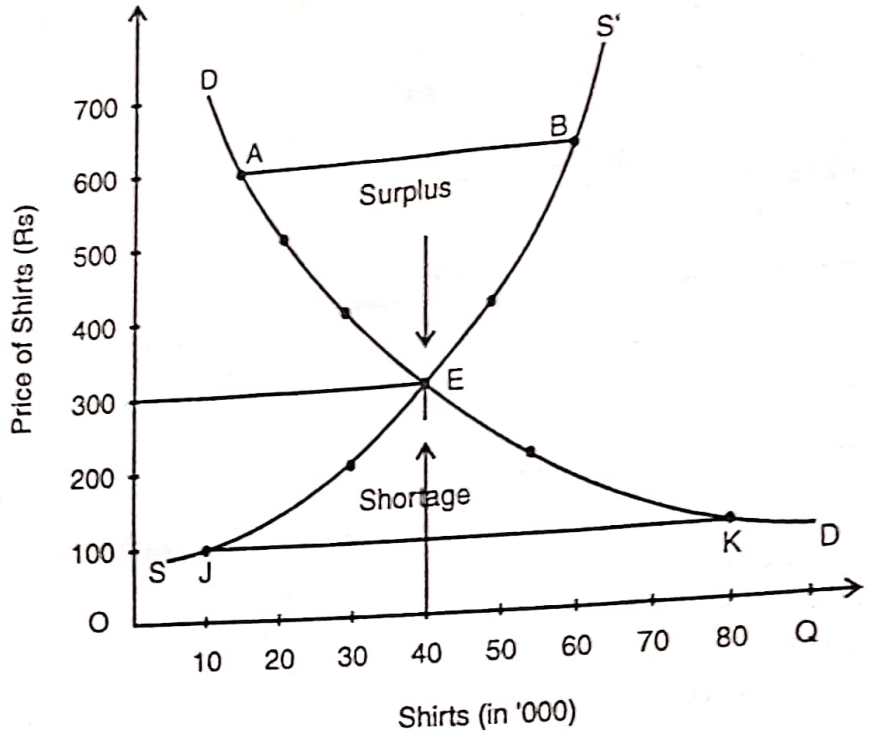


Fig. 3.11 Equilibrium of Demand and Supply: Price Determination

Let us now see how market works to bring about balance in demand for and supply of shirts. Let the price be initially set at Rs 600. At this price, suppliers bring in a supply of 60 thousand shirts whereas buyers are willing to buy only 15 thousand shirts. The supply, obviously, far exceeds the demand. As Fig. 3.11 shows, the excess supply equals, $AB = 60 - 15 = 45$ thousand shirts. The suppliers would, therefore, lower down the price gradually in order to get rid of the unsold stock and cut down the supply simultaneously. Besides, when price falls, demand for shirts increases too. In this process, the supply-demand gap is reduced. This process continues until price reaches Rs 300 at point E, the point of equilibrium where demand and supply equal at 40 thousand shirts. At this price, the market is in equilibrium and there is no inherent force at work which can disturb the market equilibrium.

Likewise, if price is initially set at Rs 100, the buyers would be willing to buy 80 thousand shirts whereas suppliers would be willing to supply only 10 thousand shirts. Thus, there would be a shortage of 70 thousand shirts as shown by the distance JK in Fig. 3.11. The shortage will force the buyers to bid a higher price. This will lead to increase in price which will encourage the suppliers to increase their supply. This process of adjustment will continue as long as demand exceeds supply. When price rises to Rs 300, the market reaches its equilibrium.

UNIT II: CONSUMER THEORY

2.1) UTILITY- CONCEPT

The concept of 'utility' was introduced to social thoughts by Bentham in 1789 and toeconomic thoughts by Jevons in 1871. In general sense, utility is the 'want satisfying power'of acommodity. In economic sense, utility is a psychological phenomenon: it is a feeling of satisfaction, pleasure,or well-being which a consumer derives from the consumption or possession of a commodity.Economists hold different views on whether utility is measurable in absolute terms. Broadly speaking there are two views regarding the measurement of utility: a) Cardinal or QuantitativeMeasurement of Utility and B) Ordinal Measurement of Utility.

a) Cardinal or Quantitative Measurement of Utility: The classical and neo-classical economists held the view that utility is cardinally or quantitatively measurable. It can be measured in cardinal numbers like weight, height, length, etc. As regardsmeasurement of utility, some early psychological experiments on individuals'response to differentkinds of stimuli led the neo-classical economists to believe that utility is measurable incardinal terms, i.e., itcanbe expressed in terms of cardinalnumbers- 1,2,3, ...

The neo-classical economists devised the following system to measure the utility of acommodity. A neo-classical economist, Walras, coined a term 'util', meaning 'units of utility' and used money asthe measure of utility with the following assumptions:

(i) utility of a commodity equals the money a consumer is willing to pay for it;

(ii) marginal utility of money remains constant; and

(iii) oneutil = one unit of money, e.g., Re 1 = 1 util;

According to this method, the utility of a commodity for a consumer equals the money (the price) which he or she is willing to pay for the commodity. For example, if a thirsty person is willing to pay Rs 20 for one bottle of water, his/her utility of one bottle of water is 20 utils.

This method of measuring utility has been rejected by the modern economists as it was realized over time that absolute or cardinal measurement of utility is not possible. The difficulties in measuring utility proved insurmountable. Money was not found to be a reliable measure of utility becauseutility of money changes with its stock. Neither economists nor psychologists nor other scientists could devise a reliable technique or instrument for measuring the feeling of satisfaction or utility. The modern economists have, therefore, discarded the concept of cardinal utility.

b) Ordinal Measurement of Utility:

Modern economists, on the other hand, hold the view that utility can be expressed only in ordinal terms, i.e., in terms of 'less than' or 'more than'. It is not a quantity or a numerical value. It is only an expression of the consumer's preference for one commodity over another or for one basket of goods over another. The concept of ordinal utility is based on the following axioms:

(i) It may not be possible for a consumer to express his utility in quantitative terms. But it is always possible for him to tell which of any two goods he prefers. For example, an individual may not be able to specifyhow much utility he derives by eating a mango. But he can always tell what he prefersbetween mango and apple, between a pair of shoes and a fancy hat, and so on.

(ii) A consumer can list all the commodities he consumes in the order of his preference.In the opinion of the ordinalists, these assumptions are sufficient to analyse consumer behavior. Intheir opinion, absolute measurement of utility is neither feasible nor necessary for analyzing

consumerbehaviour. This marks the most significant departure of the ordinalists from the cardinal utilityapproach to consumer analysis.

Assumptions of the Ordinal UtilityTheory:

The ordinal utility theory makes the following assumptions.

i) **Rationality:**A consumer is assumed to be a rational being. He aims at maximising hissatisfaction. Given his income and prices of goods and services he consumes, his decisions are consistent with his objectives. Also, he has full knowledge of his own circumstances and conditions required for rational decision.

ii) **Ordinal utility:** Unlike cardinal utility approach, ordinal utility approach assumes that utility is ordinally measurable by consumer's subjective evaluation. That is, a consumer is able to express only the order of his preferences.

iii) **Transitivity and consistency of choice.** Consumer's choices are assumed to be transitive. Transitivity of choice means that if a consumer prefers A to B and B to C, he must prefer A to C. Or, if he treats A = B and B = C, he must treat A = C. Consistency of choice means that if a consumer prefers A to B in one period, he must not prefer B to A in another period or treat them as equal, everything remaining the same. The transitivity and consistency in consumer's choices maybe symbolically expressed as follows.

Transitivity: If A> B, and B > C, then A > C, and

Consistency: If A> B in one period, then B $\not>$ A or B $\neq$ A in another.

iv) **Nonsatiety:**Nonsatiety means that the consumer has not reached the point of saturation in case of any commodity and he is not oversupplied with goods in question. Therefore, a consumer always prefers a larger quantity of all the goods.

v) **Diminishing marginal rate of substitution:** The marginal rate of substitution is the rate at which a consumer is willing to substitute one commodity (X) for another (Y) so that his total satisfaction remains the same. This rate is given by $\Delta Y / \Delta X$. The assumption is that $\Delta Y / \Delta X$ goes on decreasing, when a consumer continues to substitute X for Y.

2.1.1) TOTAL UTILITY:

According to the cardinal utility approach, it is possible to measure and express total andmarginal utility in quantitative terms. Total utility (TU) from a single commodity, maybe defined as the sum of the utility derived from all the units consumed of the commodity. For example, if a consumer consumes 4 units of a commodity and derivesU_1,U_2,U_3 and U_4 utils from the successive units consumed, then

$$TU = U_1+U_2+U_3+U_4$$

If he consumes n units, then his total utility (TU) from n units may be expressed as

$$TU_n = U_1 + U_2 + U_3+..... + U_n.$$

In case number of commodities consumed is greater than one, then

$$TU = TU_a + TU_b + TU_c+..... +TU_n$$

where subscripts a, b, c and n denote commodities.

2.1.2) MARGINAL UTILITY:

The marginal utility can be defined as the utility derived from the marginal or the last unit consumed. Marginal utility is defined also as the addition to total utility derived from the consumption or acquisition of one additional unit. More precisely, marginal utility (MU) is the change in the total utility resulting from the consumption of one additional unit. That is,

$$MU = \frac{\Delta TU}{\Delta C}$$

where ΔTU = change in total utility, and ΔC= change in consumption by one unit.

Marginal utility (MU) may also be expressed as

$$MU = TU_n - TU_{n-1}$$

where TU_n = total utility derived from the consumption of n units and TU_{n-1} = total utility derived from the consumption of n-1 units.

2.2) THE LAW OF DIMINISHING MARGINAL UTILITY

The law of diminishing marginal utility is central to the cardinal utility analysis of the consumerbehaviour. This law states that as the quantity consumed of a commodity increases per unit of time, the utilityderived by the consumer from the successive units goes on decreasing, provided the consumption of all other goods remains constant. This law stems from the facts (i) that the utility derived from a commodity depends on the intensity or urgency of the need for that commodity, and (ii) that as more and more quantity of a commodity is consumed, the intensity of desire decreases. For these reasons, the utility derived from the marginal unit goes on diminishing. For example, suppose a hungry person is offered bananas to eat. The satisfaction which he derives from the first banana would be the maximum because intensity of his hunger is the highest. When he eats the second banana,he derives a lower satisfaction because intensity of his hunger is reduced. As he goes on eating more bananas, the intensity of his hunger goes on decreasing and therefore the satisfaction which he derives from the successive units goes on decreasing. If he continues to eat bananas, a point is reached when his hunger is fully satisfied and, therefore, the last banana gives him zero utility. Eating bananas any more will give him a negative utility in the form of discomfort or stomach ache. This relationship between quantity consumed and utility derived from each successive unit consumed is called the law of diminishing marginal utility.

Numerical example: Numerical illustration of the law of diminishing marginal utilityis presented in Table 2.2 below. As the table shows, total utility increases with increase in consumption of bananas, but at a decreasing rate. It means that, MU decreases with increase in consumption. This is shown in the last column of the table.

TABLE 2.2: Total and Marginal Utility

Bananas	Total Utility	Marginal Utility
1	40	40
2	70	30
3	90	20
4	100	10
5	100	0
6	90	-10

Table 2.2 shows that the total utility reaches maximum at 100 when5bananasare consumed. Here, MU = 0. Consumption of the 6th banana yields negative utility and the total utility starts declining.

Graphical illustration: The law of diminishing marginal utility is graphically illustrated in Figure2.2. The total utility (TU) and marginal utility (MU) curves have been obtained by plotting the datagiven in Table 2.2. The total utility curve (TU) is rising till the 5th banana is consumed. Note that the TU curve is rising but at a diminishing rate. It shows decrease in the MU,i.e., the utility added to the total. Thediminishing marginal utility has been shown by the MU curve. Beyond 5bananas

consumed, themarginal utilityturns negative. It means that additional consumption of bananas yields disutility in the form of discomfort.

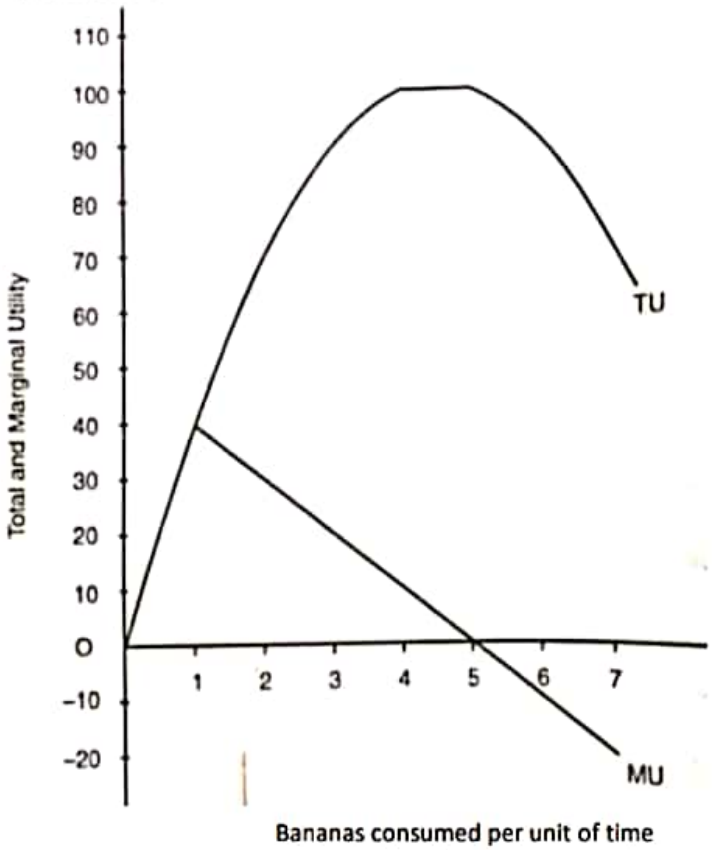


FIGURE 2.2

Assumptions: The law of diminishing marginal utility is based on the following assumptions.

1. The unit of the consumer goods must be standard, e.g., a cup of tea, a bottle of cold drink, a pairof shoes or trousers etc. If the units are excessively small or large, the law may not apply.
2. Consumer's taste and preference remain unchanged during the period of consumption.
3. There must be continuity in consumption and where break in continuity is necessary, it must be appropriately short.
4. The mental condition of the consumer remains normal during the period of consumption. For, if a person is eating and also drinking (alcohol) the utility pattern will not be certain.

Given these conditions, the law of diminishing marginal utility holds universally. In some

(5) **Useful in International Trade :** A country benefits from such exports which have price – inelastic demand because a better price can be fetched.

(6) **Explanation of the 'Paradox of Plenty' :** The concept of elasticity of demand also helps in explaining 'paradox of plenty' in agriculture i.e. bumper crops bring in smaller income to the farmers. A bumber crop instead of raising income of the farmers reduces the prices of agricultural products in view of the inelastic demand for these products. That is why the government fixes the minimum support prices.

2.10 UTILITY APPROACH

Micro economics deals with pricing of commodities and services, The price of a commodity depends upon the demand for and the supply of it. The theory of demand explains the demand for a commodity and the factors determining it. The classical economists neglected the demand aspect and studied the supply aspect. Because of this lopsided approach they could not arrive at the price theory. Hence utility cannot determine the price of a commodity. In other words, value in use cannot determine the value in exchange of a commodity. The theory was developed by French and Austrian economists Leon Walras and Carl Menger.

Utility : It may be defined as the power of commodity or services to satisfy human wants. It is essentially a subjective concept.

The term carries no moral, or ethical or legal significance. In other words utility should not be confused with morality. A commodity may not be useful yet it may have utility for particular persons. For example, liquor is considered to be harmful and injurious to health.

The theory of demand developed through time can be divided into

(1) Cardinal utility analysis
(2) Ordinal utility analysis
(3) Revealed preference analysis
(4) Cardinal utility analysis of risky choice

2.11 CARDINAL UTILITY APPROACH

Assumptions : In examining the above cardinal approach we will first state the assumptions on which they are based.

(1) *Rationality :* The consumer is rational. He aims at the maximisation of his utility subject to his income limitation.

(2) *Cardinal Utility :* The utility of each commodity is measurable in terms of money.

(3) *Constant Marginal Utility of Money :* This assumption is necessary if the monetary unit is used as the measure of utility. The essential feature of a standard unit of measurement is that, it should be constant. If the marginal utility of money changes as income increases the measuring rod for utility becomes an elastic ruler, inappropriate for measurement.

(4) *Diminishing Marginal Utility :* The utility gained from successive units of a commodity diminishes.

(5) *Total Utility Depends Upon Quantities of Individual Commodities.*

The total utility of a "basket of goods" depends on the quantities of the individual commodities. If there are N commodities in the basket with quantities X_1, X_2, Xn the total utility is;

$$U = f(X_1, X_2 \ldots\ldots Xn).$$

In the early version of the law it was assumed that the total utility is additive

$$U = U_1 (X_1) + U_2 (X_2) \ldots\ldots + Un (Xn).$$

the additivity assumption was dropped on later versions of the cardinal utility theory.

Cardinal Utility means that utility can be measured. It is usually measured and compared with the price which a person pays for one of the two commodities.

Ordinal Utility means that utilities can be ranked according to the preference of the individuals and they cannot be measured. The terms cardinal and ordinal have been borrowed from mathematics. The numbers 1,2,3,4, are cardinal in the sense that the number 2 is twice the size of number 1 and number 4 is twice the size of number 2.

In contrast, the ordinals are 1st, 2nd, 3rd, 4th etc. It is not possible from this ranking to know the actual size of related numbers, the 2nd needs not be twice as that of the 1st nor the 4th twice as that of the 2nd, the size may be of any pattern say 1st, 2nd, 3rd could be 10, 15, 25. According to ordinalists, utility being subjective cannot be measured and to quantify it, is absurd.

Total Utility : Total utility refers to the total satis- faction derived by the consumer from the consumption of a given quantity of commodity. It is the sum total of satisfaction derived by consuming all the quantities of commodity in possession or purchased. It is the aggregate of the utility that a consumer derives from the consumption of a certain amount of commodity. Mathematically, TU can be be obtained by the sum of the marginal utilities from the consumption of different units of the commodity

$$TU_n = MU_1 + MU_2 + ...+ MU_n$$

Marginal Utility : It is the additional utility derived from consumption of an additional unit of a commodity. In other words it is the utility from the last unit of a commodity consumed. Additional unit is known as marginal unit and the utility from the additional unit is called marginal utility.

Marginal Utility = Utility of the Last Unit

Marginal Utility And Total Utility Schedule

Units Consumed	Marginal Utility	Total Utility
0	—	0
1	10	10
2	8	18
3	5	23
4	2	25
5	1	26
6	0	26
7	3	23

Relationship between TU and MU Curves.

We can easily follow the relationship between MU and TU by the help of the following graph. In this graph, we get three things or relations i.e.

(1) The point where marginal utility becomes zero, is called the point of satiety .

(2) As the point of satiety is reached marginal utility falls to zero and total utility stops rising. At this stage total utility is maximum.

(3) If consumption is expanded beyond the point of satiety, marginal utility turns negative and as a result total utility declines. At this stage total utility declines at an increasing rate.

There is a definite and well-defined relationship between total and marginal utility.

1. TU curve starts from the origin increases at a decreasing rate, reaches a maximum and then starts falling.

2. MU curve is the slope of TU curve

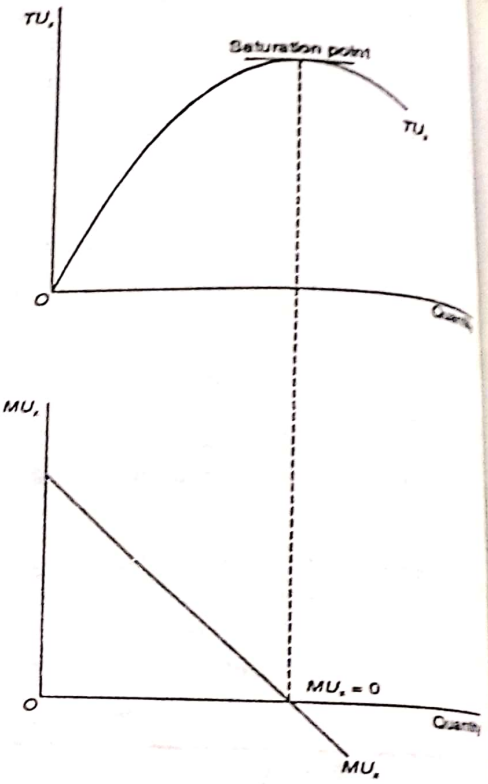
Since $MU = \frac{\partial TUx}{\partial Qx}$

3. When TU is maximum, called saturation point, MU is zero

4. When TU rises but at decreasing rate, MU curve falls

5. When TU falls, MU curve becomes negative.

6. The falling MUx curve exhibits the Law of Diminishing Marginal Utility.



The Law of Diminishing Marginal Utility (LDMU)

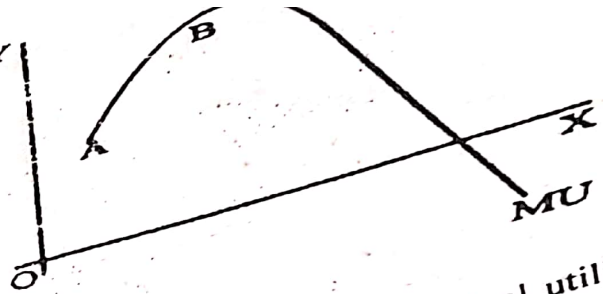
This law can be traced back to the writings of Gossen and Bentham. It was however, William Stanley Jones who for first time, projected its bearing on the determination of value. According to this law, as a person purchases more and more units of a commodity its marginal utility declines. In simple terms it means that the more of a thing we have the less we want it.

The law of diminishing marginal utility is universal in character. It is based on the common consumer behaviour that as more and more units of a commodity are provided to him, the utility of additional units (MU) goes on decreasing successively. This is due to the reason that the moment a person begins consumption of a commodity to satisfy his want, its intensity starts diminishing and the commodity that is being consume becomes less and less useful. If this process continues for sometimes, a stage is reached where the consume fails to derive any satisfaction from the consumption of additional units.

The law of diminishing marginal utility (LDMU) is operative in all cases. For example, the want of a thirsty man for a glass of water is strong but it reduces when he goes for a second and more glasses of water. A hypothetical example is provided in the following table.

Units of Mangoes	TU of Mangoes	MU
1	10	10
2	25	15
3	38	13
4	47	9
5	50	3
6	50	0
7	48	–2
8	43	–5

Assuming that a consumer consumes mango one after another without time lag, as per the rule the MU derived from the additional units decline. The MU reaches zero when the 6th unit of mangoes is taken. He enjoys disutility or dissatisfaction beyond 6th unit. This is shown in following figure:



Importance of Law of Diminishing Marginal Utility

(1) It helps in redistribution of wealth.

(2) The determination of the optimum level of consumption.

Limitations or Exceptions to Law of Diminishing Marginal Utility

(1) It is pointed out that the consumption of liquor is not subject to the law of diminishing marginal utility, the more a person drinks liquor the more he likes it. It is said that the marginal utility of liquor instead of diminishing actually rises with increase in consumption.

(2) The law does not apply to money. The more money a person has, the greater is the desire to acquire still more of it.

(3) Hobbies as collection of stamps, old paintings, coins, old glass and so are exception to law of diminishing marginal utility.

(4) Articles of conspicuous consumption.

Law of Equi-marginal Utility: Consumer's Equilbrium

The law of equi-marginal utility states that the consumer will distribute his money income between the goods in such a way that the utility derived from the last rupee spent on each good is equal. In other words, consumer is in equilibrium position when marginal utility of money expenditure on each good is the same. The marginal utility of money expenditure on a good or the utility of money expenditure on each good is the same. The marginal utility of the good divided by the price of that good. In symbols,

$$MU_E = \frac{MU_x}{P_x}$$

Where MU_E is marginal utility of money expenditure, MU_x is the marginal utility of the good x and Px is the price of X.

Consumer will be in equilibrium in respect of the purchase of two goods x and y when,

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = MU_E$$

Thus, with several goods to buy with a given money income the consumer will be maximising utility and in equilibrium when the following condition prevails.

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \ldots\ldots \frac{MU_n}{P_n} = MU_E$$

MU of Goods X and Y

Units	MU_x	MU_y
1	20	24
2	18	21
3	16	18
4	14	15
5	12	12
6	10	9

2.7) CONSUMER'S EQUILIBRIUM:

Iftherearenorestrictionsonthepowerofthеconsumertobuycommodities, he would like to purchase more and more of them. In other wordsa consumer would like to go to the highest indifference curve. But this wouldnot be the case in the real world. In actual practice, the consumer is constrainedby his money income and the respective prices of the two commodities inquestion. In order to get maximum satisfaction, the consumer is to select apoint on the price line only.

While explaining the consumer's equilibrium i.e. his taking decision onto how much of a good to buy, we shall have to make the following assumptions:

(i) The consumer has an indifference map showing his scale of preferencesfor combinations of the goods in question and money.

(ii) The scale of preferences imprinted on his mind remainsunchangedthroughout the analysis.

(iii) Hehas limited money income which, if he does not spend on the goodsin question, will certainly spend on some other good or goods.

(iv) He is one of the many buyers and knows the prices of all goods. Allprices remain constant until a new equilibrium is to be attained.

(v) All goods are homogeneous and divisible.

(vi) The consumeracts rationally and aims at maximising his satisfaction.

(vii) The condition of transitivity is satisfied. If combination A > B and B>C,thenA>C.

(viii) Thecondition of non-satiety holds. The consumer prefers more of onecommodity or of the other or of both.

On the basis of these assumptions, we can proceed to show how theconsumer decides how much of a good to buy to maximise satisfaction or howto reach the highest possible indifference curve. The equilibrium of the consumerhas been shown in the figure 2.7, where the indifference map and budget line are brought together.

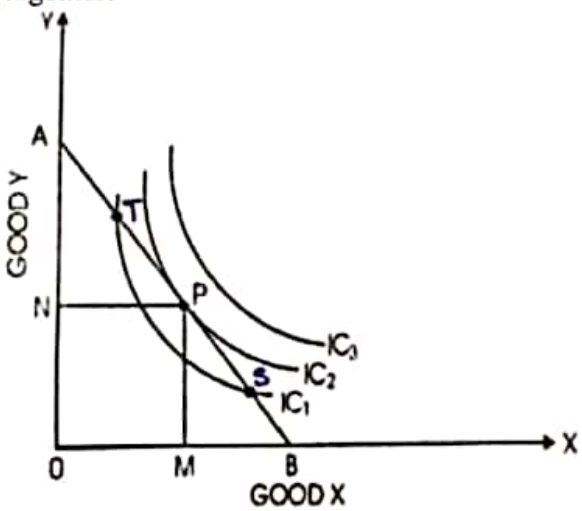


Figure 2.7

With given money to be spent and given prices of the two goods, the consumer can buy any combination of the goods which lies on the budget line AB. Every combination on the budget line AB costs him the same amount of money. In order to maximize his satisfaction the consumer will try to reach the highest possible indifference curve which he could with a given expenditure of money and given prices of the two goods. Budget constraint forces the consumer to remain on the given budget line, that is, to choose a combination from among only those which lie on the given budget line.

It will be seen from Fig. 2.7 that the various combinations of the two goods lying on the budget line AB and which therefore he can afford to buy do not lie on the same indifference curve; they lie on different indifference curves. The consumer will choose that combination on the budget line AB which lies on the highest possible indifference curve. It is the indifference curve to which the budget line AB is tangent. Any other possible combination of the two goods would lie on a lower indifference curve and thus yield less satisfaction or would be unattainable. Here the budget line AB is tangent to indifference curve IC_2 at point P. Since indifference curves are convex to the origin, all other points on the budget line AB, above or below point P like T and S, would lie on the lower indifference curve. It is evident from the Fig. 2.7 that T and S lie on the lower indifference curve IC_1 and will therefore yield less satisfaction than P. It is thus clear that of all possible combinations lying on AB, combination P lies on the highest possible indifference curve and yields maximum possible satisfaction. Of course, combinations lying on indifference curve IC_3 will give greater satisfaction to the consumer than P, but they are unattainable with the given money income and the given prices of the goods as represented by the budget line AB.

It is therefore concluded that with the given money expenditure and the given prices of the goods as shown by AB the consumer will obtain maximum possible satisfaction and will therefore be in equilibrium position at point P at which the budget line AB is tangent to the indifference curve IC_2. The consumer will buy OM amount of good X and ON amount of good Y. At the equilibriumpoint P, the slopes of the indifference curve IC_2 and the budget line AB are equal. We know that the slope of the budget line equals ratio of prices of the two goods P_x/P_y and theslope of the indifference curve is given by marginal rate of substitution of X for Y (MRS_{xy}). Thus, at the equilibrium point P,

$$MRS_{xy} = \frac{P_x}{P_y}$$

There is a subsidiary condition too. At the point of equilibrium theindifference curve must be satisfying all the properties of indifference curves.In fig 2.7.1, the price line is tangentto an indifference curveat point E but E is not the point of equilibrium because the indifference curveis not convex here, rather it is concave here. If the consumer moves up or downalong AB he reaches an upper indifference curve which gives him greatersatisfaction. Therefore, the consumer will make the move. The moment theconsumer moves, he will not be in equilibrium. Hence, the indifferencecurve must be convex at the point of tangency of price line and an indifference curve.

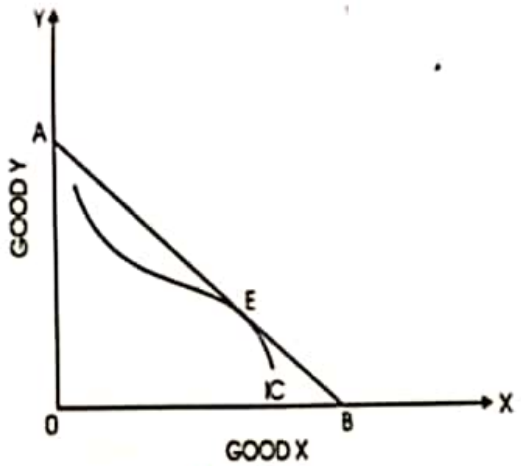


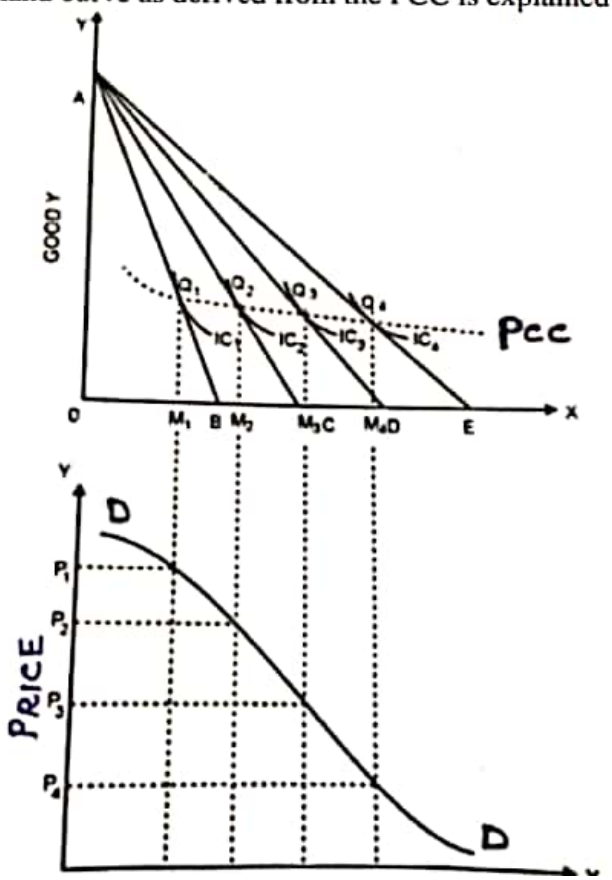
Fig. 2.7.1

2.8) DERIVATION OF DEMAND CURVE FROM INDIFFERENCE CURVE AND BUDGET CONSTRAINT:

We are now in aposition to make a comparison between Price ConsumptionCurve (PCC) and the traditional demand curve. The PCC shows the relation betweenthe changes in the price of commodity and the corresponding changes in theconsumption of acommodity by a consumer. This is precisely what aconventional price quantity demand curve also tells us i.e., how much a consumerwill demand at different prices of a commodity. In fact the individual demand curveand its price consumption curve gives us the same information althoughthe former gives it in a more direct, useful form. But the two curves areconstructed in different ways. The PCC is drawn with two commoditiesrepresented on two axes or with one commodity on the OX-axis and moneyincome on the OY-axis while the demand curve is drawn with quantity of acommodity demanded on the OX-axis and the price of the same commodityon the OY-axis.

Price consumption curve traces the effects of a change in price on thequantity demanded of a good. But price consumption curve does not directlyrelate price with quantity demanded. In indifference curve diagram 2.8, priceis not explicitly shown on theY-axis. On the other hand, demand curve directlyrelates price with quantity demanded, price being shown onY-axis and quantitydemanded on the X-axis. A demand curve shows how much quantity of thegood will be purchased or demanded, at various prices, assuming that tastes and preferences of the consumer, his income, prices of all other goods remain constant. This demand curve showing explicit relationship between price andquantity demanded can be derived from price consumption curve of indifferencecurve analysis.

The individual demand curve as derived from the PCC is explained in thediagram 2.8.



Intheupperportionofthefigure,we takemoneyontheY-axisandgoodX on the X-axis. AB, AC, AD and AE are the price lines which show that theprice of X is falling. Q_1,Q_2,Q_3 and Q_4indicate the successive equilibriumpoints for each price line. Thus, the PCC shows the various quantities of commodity X,bought by the consumer at its different prices. The price of X per unit is OA/OB (Total money income divided by the total quantity of X which can be boughtby the money income) and at this price the consumer buys OM_1 units of thecommodity. Similarlyat OA/OC price the consumer buys OM_2 units of the same commodityand so on. This can be explained in the following table:

Price of X	Demand for X
OA/OB or OP_1	OM_1
OA/OC or OP_2	OM_2
OA/OD or OP_3	OM_3
OA/OE or OP_4	OM_4

Now in the lower portion of the figure, the various quantities of X (OM_1,OM_2, OM_3 and OM_4) are measured along the X-axis whereas different prices(OP_1, OP_2, OP_3 and OP_4) are taken on the Y-axis. By plotting these prices andquantities, and by joining the points so plotted we get the required demandcurve DD of the individual.

The demand curve slopes downwards to the right and this is the generalslope of the curve. The income effect and the substitution effect are both positive.But in the case of 'Giffen goods' the demand curve may slope downwards tothe left and then it may revert back to its normal position by sloping to the right.This is because a 'Giffen good' is so only for a few consumers. To counteractthe peculiar behaviour of a few people that consider a commodity a Giffengood over a certain price range, there may be enough other people in the marketthose do not consider it so. Not only this, as the price of the commodity falls,many new buyers may enter the market to buy the commodity. Thus, on thewhole, we may fairly expect that when the price of a commodity falls, its marketdemand will extend and the curve may be taken to slope downwards to theright.

2.9) CRITICISM OF INDIFFERENCE CURVE ANALYSIS:

Indifference curve analysis is criticised on the following grounds:

1. It is claimed that it has simply substituted new concepts and equationsinstead of old concepts. Instead of the concept Utility, the term 'Preference' has been used. Instead of Cardinal number System of one, two, three, four, etc., ithas made use of ordinal number system of first, second, third, etc., torepresentconsumer's preferences. The notion of Marginal Utility has been replaced byMarginal Rate of Substitution. Thus, Robertson has correctly pointed out thatit is an old wine in new bottles.

2. The indifference curve analysis is based on the wrong assumption thatthe consumer is familiar with his entire preference schedule. This analysisassumes that every consumer is fully conscious of the various combinations ofthe two goods, say, apples and bananas, which givehim equal satisfaction.Now, it may not be realistic on our part to make this assumption because it isphysically not possible for a consumer to have complete knowledge of all thecombinations of the two goods which afford him equal satisfaction.

3. Further, another unrealistic element is present in Indifference CurveAnalysis. It is pointed out that such curves include even the most ridiculouscombinations which may be far removed from this

habitual combinations. Forexample, while it may be perfectly sensible to compare whether three pairs ofshoes and six shirts would give a consumer as much satisfaction as two pairsof shoes and seven shirts, the consumers will be at a loss to know and comparethe desirability of an absurd combination such as eight pairs of shoes and oneshirt. The way the indifference curves are constructed, they include absurdcombination like the one just indicated.

4. A further shortcoming of the indifference curve technique is that itcan demonstrate and analyse consumer's behaviour effectively only in simplecases, especially those in which the choice is between the quantities of twogoods only. In order to demonstrate the case of three goods, three dimensionaldiagrams are needed which are difficult to understand and handle.

5. Moreover, the Indifference Curve Analysis is not completely free fromthe assumptions of Utility Analysis; the Indifference Curve Techniques alsoassume that units of commodities are small and consumer spends his incomeso as to get maximum preference. The Law of Diminishing Marginal Returnsassumes that under given conditions, the consumer will make choice as to knowthat is better and what is worse and will choose the better. Evidently this isassuming rational behaviour. The rational behaviour is the basis of theIndifference Curve Analysis as of the Utility Analysis. Thus, Indifference CurveAnalysis is based on no different fundamental assumptions than the utilityanalysis.

6. The Indifference Curve Analysis is also criticised on the ground thatit is also not able to solve many important problems. The individual preferencecan be easily analysed with the help of indifference curves. But this is not thecase with the choices of groups of people. We cannot, for instance, drawindifference curves for the country as a whole or for the international trade. Thefact is that the indifference curve analysis is not very readily applicable in theanalysis of group equilibrium.

7. There is no recognition, in this analysis of the way in which the individual's preferences may be shaped by advertising and other selling tactics.There is no allowance for the effects of habits and customs on the consumer.The indifference map is a highly static device. In reality it may be a very shortrunphenomenon subject to frequent changes.

Thus, the Indifference Curve Analysis is not free from defects. Schumpeterhas rightly observed that the new technique has neither proved anything newnor has it proved any old result wrong.

COSTS

Cost is an amount that has to be paid or given up in order to get something.

In business, cost is usually a monetaryvaluation of (1) effort, (2) material, (3) resources, (4) time and utilities consumed, (5) risks incurred, and (6) opportunity forgone in production and delivery of a good or service. All expenses are costs, but not all costs (such as those incurred in acquisition of an income-generating asset) are expenses.

TYPES OF COSTS:

Economic Cost. Economic cost includes both the actual direct costs (accounting costs) plus the opportunity cost. For example, if you take time off work to a training scheme. You may lose a weeks pay £350, plus also have to pay the direct cost of £200. Thus the total economic cost = £550.

Accounting Costs – this is the monetary outlay for producing a certain good. Accounting costs will include your variable and fixed costs you have to pay.

Sunk Costs. These are costs that have been incurred and cannot be recouped. If you left the industry you cannot reclaim sunk costs. For example, if you spend money on advertising to enter an industry, you can never claim these costs back. If you buy a machine, you might be able to sell if you leave the industry.

Avoidable Costs.Costs that can be avoided. If you stop producing cars, you don't have to pay for extra raw materials and electricity. Sometimes known as an escapable cost.

Nominal Cost and Real Cost:

Nominal cost is the money cost of production. It is also called expenses of production. These expenses are important from the point of view of the producer. These expenses are paid out by him to the factors he employs or for the raw materials he uses in production. He must make sure that the price he gets for the product covers, in the long run, these expenses including normal profit, otherwise he cannot continue in business.

Real Cost:

The real cost of production has been variously interpreted. Adam Smith regarded pains and sacrifices of labour as real cost of production. Marshall included under it the "real cost of efforts of various qualities", and "real cost of waiting." This Marshall called as the social cost of production. Some economists define real cost as the next best alternative sacrificed in order to obtain a commodity. It is also called opportunity cost or displacement cost

Explicit Costs and Implicit Costs:

Costs of production can be classified as Explicit Costs and Implicit Costs. Explicit costs are also called paid-out costs. These costs the entrepreneur has to pay to those persons from whom he has obtained factors of production or services. For instance, he has to pay wages to the labour he has employed, interest on the capital that he has borrowed and rent of land or factory or business premises. These are explicit costs.

Implicit costs, on the other hand, are costs which have not to be paid out to others but the costs which the entrepreneur pays to himself, as it were. Perhaps he himself is the owner of the business premises, he may have invested his own capital side by side the capital he may have borrowed from others. He may be a whole-time worker in the business, for instance he may be a managing director for which he may not be drawing any salary.

If he had lent out these factors to others, he would have received remuneration from them. Hence they must be taken into account while calculating profit. But since they are not actually paid out to anybody, they are called implicit costs.

Opportunity Cost:

In modern economic analysis, the term real cost is interpreted in the sense of opportunity cost. It is also called 'alternative cost' or 'transfer cost'. Opportunity cost of a commodity is the alternative sacrificed in order to obtain it. Suppose you have Rs. 5 with you and you have two alternatives before you, either to go to a cinema show or buy a pen. Suppose further that you decide to buy the pen and forego the cinema show. In this case, what is the price of the pen? Apparently, it is Rs. 5, but really it is the cinema show, the alternative you have foregone or sacrificed. This is its opportunity cost.

Since productive resources are limited, if they are used in the production of one commodity, they are not available for the production of another. The commodity which is sacrificed or not produced is the real cost of the commodity that is produced. Thus, the cost of production, in the sense of opportunity cost, means not the efforts and sacrifices undergone, but the most attractive alternative foregone or the next best choice sacrificed. The cost of production of a commodity is fundamentally the sum-total of retention prices that have to be paid to the productive services for retaining them in a particular industry, and this must at least be equal to what they can command elsewhere.

Production Costs:

Production costs refer to the total amount of money spent in the production of goods. They include the cost of raw materials and freight thereon, the costs of manufacture, i.e., the wages of workers engaged in the manufacture of the commodity and salaries of the manager and other office staff including those of peons, chowkidars, etc. They also include other overheads like rent, interest on capital, taxes, insurance and other incidental expenses

like costs of repairs and replacements. They include both prime costs and supplementary costs.

Selling Costs:

Selling costs are the costs of marketing, advertisement and salesmanship. These costs are incurred to attract customers, expand market and capture more business and retain the existing business. These costs are essential costs of the competitive economy. They are especially important in the case of imperfect competition in which goods are not identical but substitutes.

The manufacturers resort to what is called product differentiation in order to change the demand curve of a particular seller to his advantage. Instead of improving the quality or lowering the price, high pressure salesmanship is resorted to win customers and this is found more profitable. Selling costs do not necessarily vary with the volume of sales.

A minimum cost of advertisement is essential to retain the existing markets. But it may also be found that sales can be increased by increasing selling costs. In that case, these costs will be variable. Selling costs like production costs are also subject to the law of diminishing returns or increasing costs.

On the whole, selling costs may be regarded as a social waste, because they add to the cost of the commodity without improving its quality or increasing its utility. Their result may be simply to redistribute the market among the existing sellers. Only in cases where the market is expanded may the costs be reduced but the reduction in costs may not be reflected in the lowering of the price. Selling costs are a peculiarity of an imperfect market and have no place in a fully competitive market where the dealers are supposed to be fully aware of the quality of the goods and the conditions of the market.

In economics, "short run" and "long run" are not broadly defined as a rest of time. Rather, they are unique to each firm.

Long run costs are accumulated when firms change production levels over time in response to expected economic profits or losses. In the long run there are no fixed factors of production. The land, labor, capital goods, and entrepreneurship all vary to reach the the long run cost of producing a good or service. The long run is a planning and implementation stage for producers. They analyze the current and projected state of the market in order to make production decisions. Efficient long run costs are sustained when the combination of outputs that a firm produces results in the desired quantity of the goods at the lowest possible cost. Examples of long run decisions that impact a firm's costs include changing the quantity of production, decreasing or expanding a company, and entering or leaving a market.

Short Run Costs

Short run costs are accumulated in real time throughout the production process. Fixed costs have no impact of short run costs, only variable costs and revenues affect the short run production. Variable costs change with the output. Examples of variable costs include employee wages and costs of raw materials. The short run costs increase or decrease based on variable cost as well as the rate of production. If a firm manages its short run costs well over time, it will be more likely to succeed in reaching the desired long run costs and goals.

Differences

The main difference between long run and short run costs is that there are no fixed factors in the long run; there are both fixed and variable factors in the short run . In the long run the general price level, contractual wages, and expectations adjust fully to the state of the economy. In the short run these variables do not always adjust due to the condensed time period. In order to be successful a firm must set realistic long run cost expectations. How the short run

Long Run Cost and It's Types

In the long run, all the factors of production used by an organization vary. The existing size of the plant or building can be increased in case of long run.

There are no fixed inputs or costs in the long run. Long run is a period in which all the costs change as all the factors of production are variable.

There is no distinction between the Long run Total Costs (LTC) and long run variable cost as there are no fixed costs. It should be noted that the ability of an organization of changing inputs enables it to produce at lower cost in the long run.

1. Long Run Total Cost:

Long run Total Cost (LTC) refers to the minimum cost at which given level of output can be produced. According to Leibhafasky, "the long run total cost of production is the least possible cost of producing any given level of output when all inputs are variable." LTC represents the least cost of different quantities of output. LTC is always less than or equal to short run total cost, but it is never more than short run cost.

The LTC curve is shown in Figure-1:

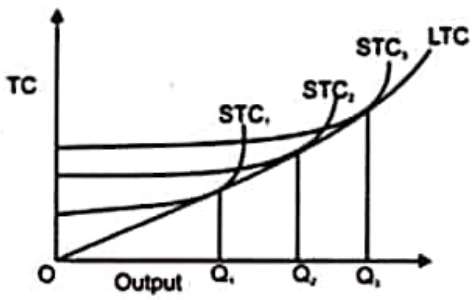


Fig 1

As shown in Figure-1, short run total costs curves; STC1, STC2, and STC3 are shown depicting different plant sizes. The LTC curve is made by joining the minimum points of short run total cost curves. Therefore, LTC envelopes the STC curves.

2. Long Run Average Cost:

Long run Average Cost (LAC) is equal to long run total costs divided by the level of output. The derivation of long run average costs is done from the short run average cost curves. In the short run, plant is fixed and each short run curve corresponds to a particular plant. The long run average costs curve is also called planning curve or envelope curve as it helps in making organizational plans for expanding production and achieving minimum cost.

Figure-2 shows the derivation of LAC curve:

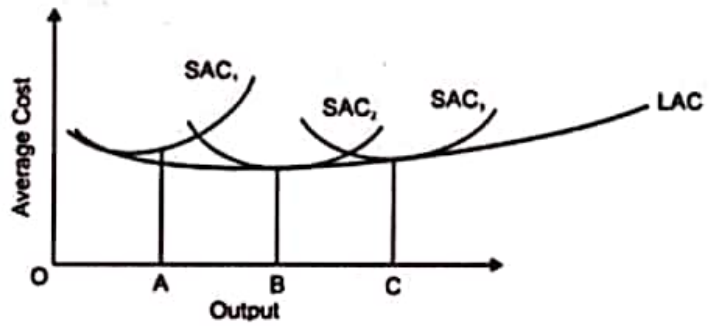


Fig 2

Suppose there are three sizes of the plant and no other size of the plant can be built. In short run, the plant sizes are fixed thus, organization increase or decrease the variable factors. However, in the long run, the organization can select among the plants which help in achieving minimum possible cost at a given level of output.

From Figure- 2, it can be noted that till OB amount of production, it is beneficial for the organization to operate on the plant SAC^2 as it entails lower costs than SAC^1. If the plant SAC^2 is used for producing OA, then cost incurred would be more. Thus, in the long run, it is clear that the producer would produce till OB on plant SAC^2. On SAC^2, the producer would produce till OC amount of

output. If an organization wants to exceed output from OC, it will be beneficial to produce at SAC^3 than SAC^2.

Thus, in the long run, an organization has a choice to use the plant incurring minimum costs at a given output. LAC depicts the lowest possible average cost for producing different levels of output. The LAC curve is derived from joining the lowest minimum costs of the short run average cost curves.It first falls and then rises, thus it is U-shaped curve.

3. <u>Long Run Marginal Cost</u>:
Long run Marginal Cost (LMC) is defined as added cost of producing an additional unit of a commodity when all inputs are variable. This cost is derived from short run marginal cost. On the graph, the LMC is derived from the points of tangency between LAC and SAC.

LMC curve can be learned through Figure-3:

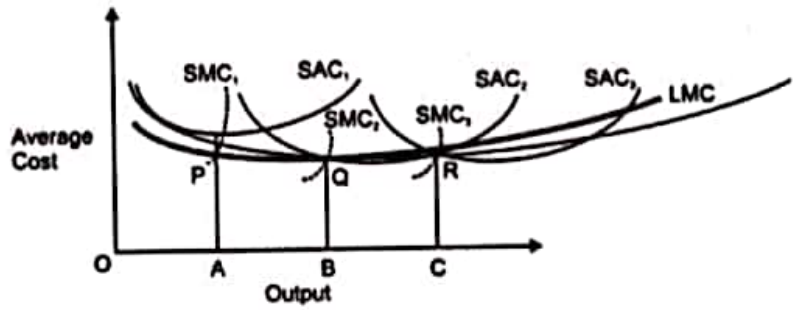


Fig 3

If perpendiculars are drawn from point A, B, and C, respectively; then they would intersect SMC curves at P, Q, and R respectively. By joining P, Q, and R, the LMC curve would be drawn. It should be noted that LMC equals to SMC, when LMC is tangent to the LAC.

In Figure-3, OB is the output at which:

$SAC_2 = SMC_2 = LAC = LMC$

We can also draw the relation between LMC and LAC as follows:

When LMC < LAC, LAC falls

When LMC = LAC, LAC is constant

When LMC > LAC, LAC rises

Short Run Cost and It's Types:

Conceptually, in the short run, the quantity of at least one input is fixed and the quantities of the other inputs can be varied.

In the short-run period, factors, such as land and machinery, remain the same.

On the other hand, factors, such as labor and capital, vary with time. In the short run, the expansion is done by hiring more labor and increasing capital. The existing size of the plant or building cannot be increased in case of the short run.

Following are the cost concepts that are taken into consideration in the short run:

i. Total Fixed Costs (TFC):

Refer to the costs that remain fixed in the short period. These costs do not change with the change in the level of output. For example, rents, interest, and salaries. In the words of Ferguson, "Total fixed cost is the sum of the 'short run explicit fixed costs and implicit costs incurred by the entrepreneur." Fixed costs have implication even when the production of an organization is zero. These costs are also called supplementary costs, indirect costs, overhead costs, historical costs, and unavoidable costs.

TFC remains constant with respect to change in the level of output. Therefore, the slope of TFC curve is a horizontal straight line.

Figure-1 depicts the TFC curve:

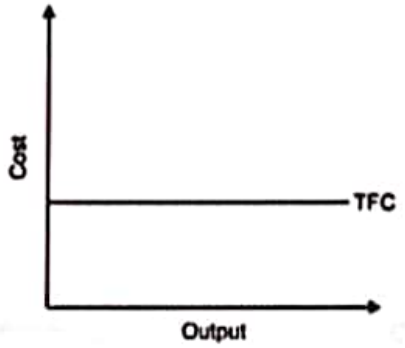


Fig 1

As shown in Figure-1, TFC curve is horizontalto x- axis. From Figure-1, it can be seen that TFC remains the same at all the levels with respect to change in the level of output.

ii. Total Variable Costs (TVC):

Refer to costs that change with the change in the level of production. For example, costs incurred on purchasing raw material, hiring labor, and using electricity. According to Ferguson, "total variable cost is the sum of amounts spent for each of the variable inputs used" If the output is zero, then the variable cost is also zero. These costs are also called prime costs, direct costs, and avoidable costs.

Figure-2 shows the TVC curve:

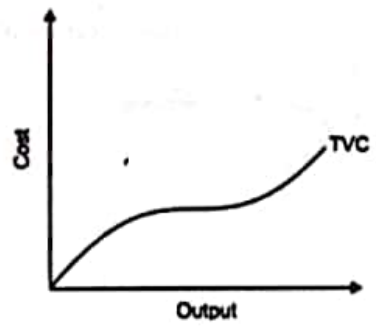


Fig 2

In Figure-2, it can be seen that TVC curve changes with the change in the level of output.

iii. Total Cost (TC):
Involves the sum of TFC and TVC.

It can be calculated as follows:

Total Cost = TFC + TVC

TC also changes with the changes in the level of output as there is a change in TVC.

Figure-3 shows the total cost curve derived from sum of TVC and TFC:

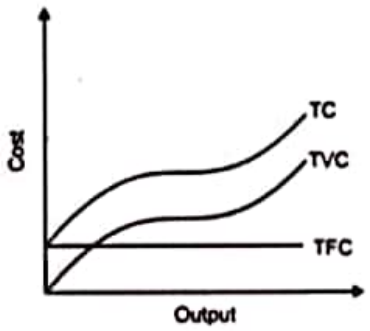


Fig 3

It should be noted that both TVC and TC increase initially at decreasing rate and then they increase at increasing rate Here, decreasing rate implies that the rate at which cost increases with respect to output is less, whereas increasing rate implies the rate at which cost increases with respect to output is more.

iv. Average Fixed Costs (AFC):
Refers to the per unit fixed costs of production. In other words, AFC implies fixed cost of production divided by the quantity of output produced.

It is calculated as:

AFC = TFC/Output

TFC is constant as production increases, thus AFC falls.

Figure-4 shows the AFC curve:

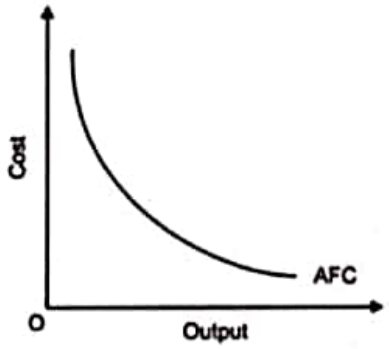


Fig 4

In Figure-4 AFC curve is shown as a declining curve, which never touches the horizontal axis. This is because fixed cost can never be zero. The curve is also called rectangular hyperbola, which represents that total fixed costs remain same at all the levels.

v. Average Variable Costs (AVC):

Refer to the per unit variable cost of production. It implies organization's variable costs divided by the quantity of output produced.

It is calculated as:

AVC = TVC/ Output

Initially, AVC decreases as output increases. After a certain point of time, AVC increases with respect to increase in output.

Thus, it is a U- shaped curve, as shown in Figure-5:

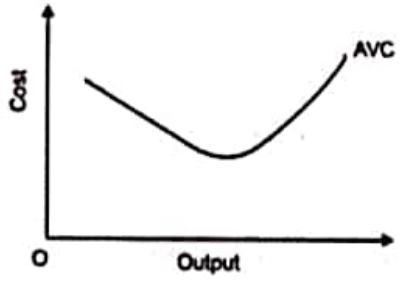


Fig 5

vi. Average Cost (AC):

Refer to the total costs of production per unit of output.

AC is calculated as:

AC = TC/ Output

AC is also equal to the sum total of AFC and AVC. AC curve is also U-shaped curve as average cost initially decreases when output increases and then increases when output increases.

Figure-6 shows the AC curve:

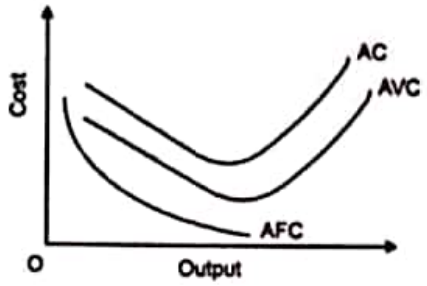


Fig 6

vii. Marginal Cost:

Refer to the addition to the total cost for producing an additional unit of the product.

Marginal cost is calculated as:

$MC = TC_n = TC_{n-1}$

n= Number of units produced

It is also calculated as:

$MC = \Delta TC/\Delta Output$

MC curve is also a U-shaped curve as marginal cost initially decreases as output increases and afterwards, rises as output increases. This is because TC increases at decreasing rate and then increases at increasing rate.

Figure- 7 shows the MC curve:

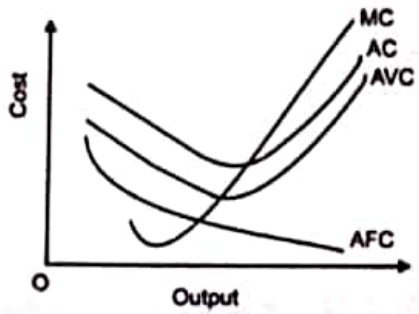


Fig7

The aforementioned cost concepts can be learned numerically with the help of Table-1:

Table-1: Calculation of Short-run Costs

Units of Output	TFC =30	TVC	TC= TFC + TVC	AFC= TFC/Output	AVC= TVC/Output	AC= AFC+ AVC	MC
0	30	0	30	-	-	-	-
1	30	10	40	30	10	40	10
2	30	18	48	15	9	24	8
3	30	24	54	10	8	18	6
4	30	32	62	7.5	8	15.5	8
5	30	50	80	6	10	16	18

Topic 2: Demand and Supply

Dr Micheál Collins
mlcollin@tcd.ie

Topic 2: Demand and Supply

1. Introduction
2. Demand
   - Definition of Demand
   - The Demand Function
   - The Law of Demand
   - The Demand Curve
   - Factors Influencing Demand
   - A movement along the Demand Curve
   - A shift of the Demand Curve

Topic 2: Demand and Supply

3. Supply
   - Definition of Supply
   - The Supply Function
   - The Supply Curve
   - Factors Influencing Supply
   - A movement along a Supply Curve
   - A shift of the Supply Curve

1. Introduction

- Why do we pay €7.50 for a kg of Beef and €25 for a haircut?
- Answer lies in out analysis of the market
- What is the market?
  - A theoretical concept, not a place
  - Talk about a market for a good or service

- ***Definition of a Market:***

  The market is any arrangement that facilitates the buying and selling of a good or service

In this market we will look at:

- ***Market Demand***

  The willingness of consumers to purchase a particular good or service
- ***Market Supply***

  The willingness of producers to provide a particular good or service

2. Demand

- ***Definition of Demand***

  The quantity of a good or service that consumers purchase at each conceivable price during a particular period

e.g.

if apples cost €0.50 each
if apples cost €1.00 each
if apples cost €10.00 each
if apples cost €0.10 each

- relates not only to what consumers want, but what they can afford
- "effective demand"
- end up with a whole range of quantities

- ***The Demand Function***
- What determines the level of demand?
- One of the key factors is price
- We can say that:
  quantity demanded is a function of price
  or
  quantity demanded depends on price
- This can be written as:
  Qd = f (P)

- ***The Law of Demand***
- The Law of Demand states that:
  - There is a negative relationship between price and quantity demanded, *ceteris paribus*
- *negative relationship*
  - a negative relationship is where two things move in opposite directions
  - e.g. P⬆ and Qty Demanded⬇; P ⬇ and Qty Demanded⬆

- *ceteris paribus*
  - Latin phrase meaning “other things being equal”
  - We say this as there are other factors which influence demand (see later)
  - By using this phrase we can say we are examining the relationship between price and demand while assuming that all other factors are not changing

- ***The Demand Curve***
- Table 2.1 shows the monthly demand for beef in Ireland at different prices
- Such a table as known as a demand schedule

Table 2.1: The Demand Schedule for Beef (per month)

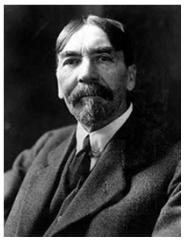
Price (P)	Quantity demanded (Qd) (000's of Kg's)
€5.00	2,625
€5.50	2,500
€6.00	2,375
€6.50	2,250
€7.00	2,125
€7.50	2,000
€8.00	1,875
€8.50	1,750
€9.00	1,625
€9.50	1,500

- ***The Demand Curve***
- Table 2.1 shows the monthly demand for beef in Ireland at different prices
- Such a table as known as a demand schedule
- We can convert this data into a demand curve (***diagram 1***) with:
  - Price on the vertical axis
  - Quantity on the horizontal axis

- Some Exceptions:
  - Not always the case that the D curve slopes down
  - 2 types of goods where it slopes up
  - A "perverse" or upward sloping D curve
  - In such a case the law of demand is broken:
  - P⬇ and Qty Demanded⬇; P⬆ and Qty Demanded⬆
  - ***Diagram 2***
- The 2 goods:
  i. Veblen Good
  ii. Giffen Good

(i) Veblen Good
- Veblen called this "conspicuous consumption"
- Some goods confer status on the owner because of cost
- The higher the price the higher the status
- If the price falls the status of the good also falls, as more people can afford to buy it
- In some cases the demand falls when the price falls
- Examples: Rolex Watches, Bentleys
- Also called "snob" goods

- Thorstein Veblen



(ii) Giffen Good

- Observation by Giffen in 19th Century London: price of bread
- As the P bread ⬆
- poor families forced to buy less meat and more bread as it was still the cheapest
- Occurs when there are low incomes, a good is a large part of overall spending and there are few substitutes

- Today, both of these are rarely observed
- Discuss…

As Mr. Giffen has pointed out, a rise in the price of bread makes so large a drain on the resources of the poorer labouring families and raises so much the marginal utility of money to them, that they are forced to curtail their consumption of meat and the more expensive farinaceous foods: and, bread being still the cheapest food which they can get and will take, they consume more, and not less of it.

- Alfred Marshall, *Principles of Economics* (1895 ed.)[i]

- Robert Giffen & Alfred Marshall

- ***Factors Influencing Demand***
  - Besides price, 5 other factors influence the quantity of a good demanded.
  - These are:

(i) Price of Substitutes (P_{sub})
  - Two goods are substitutes if consumers consider one good as an alternative for the other
  - e.g. butter and margarine, tea and coffee,…
  - if the price of good A ⬇ the demand for it will ⬆ and the demand for its substitute (good B) will ⬇
  - vice versa

(ii) Price of Complements (P_{comp})

- Goods which are complements are bought and sold together
- e.g. computers and printers, Music Downloads and MP3 players,…
- if the price of one good falls the demand for the other good will increase
- vice versa

(iii) Income (Y)

- If income changes this will usually have an impact on demand
- There are two types of impacts:

A *normal good* where the demand for the good increases as income increases and demand decreases as income decreases (positive relationship)

Most goods are normal goods

An *inferior good* where there is a negative relationship with income. As income increases demand decreases and as income decreases demand for the good increases

Examples include: minced beef, "yellow packs", …

- The impact on demand will depend whether the good is a normal good or an inferior good

(iv) Tastes (T)

- People's tastes and preferences for a good can influence its demand
- These develop over time based on custom, tradition, fashion, location,…
- Generally, they change very slowly
- However, can change rapidly
- e.g. beef after BSE scare and airline flights after Sep 11th 2001

(v) Other Factors (O)

- There are many other influences on demand
- Such as: marketing, advertising, expectations of future price changes,…

- Overall, demand for a good is influenced by all these factors
- We can re-write the demand function with these as:

$$Qd = f(P, P_{sub}, P_{comp}, Y, T, O)$$

- If we examine the relationship between Qd and P, we can assume that all other things remain unchanged (*ceteris paribus*)

- ***A movement along a Demand Curve***
  - A movement along a demand curve is caused by a change in price
  - Say the price of beef falls from €7.50 to €6.00 per kg
  - The quantity demanded will increase
  - ***Diagram 3***
  - Moving from point A to point B along the demand curve means that the Qd increases to 2,375,000 kg per month

- **A shift of the Demand Curve**
  - This occurs if one of the conditions of demand changes
  - These are: P_{sub}, P_{comp}, Y, T, O
  - If one of these changes then each single point on the demand curve shifts/moves either out to the right or in to the left
  - For example: an ⬆Y
  - For a normal good, people will demand more of a good at each price level
  - This causes the curve to shift out (to D1)
  - Previously Q* was demanded at P*, now Q1 is demanded at P*
  - ***Diagram 4*** (opposite ***Diagram 5***)

- An outward shift in the demand curve
  - ⬆ P_{sub}
  - ⬇P_{comp}
  - ⬆Y for a normal good
  - ⬇Y for an inferior good
  - ⬆ people's tastes/preferences for the good

- An inward shift in the demand curve
  - ⬇P_{sub}
  - ⬆P_{comp}
  - ⬇Y for a normal good
  - ⬆Y for an inferior good
  - ⬇ people's tastes/preferences for the good

3. Supply

- **Definition of Supply**

  The quantity of the good or service that sellers offer at each conceivable price during a particular time period
  - supply is related to resources or inputs used to produce goods and services
  - these are: land, capital, labour
  - often known as Factors of Production
  - end up with a whole range of quantities supplied at different prices

- **The Supply Function**
- What determines the level of supply?
- One of the key factors is price
- We can say that:

  quantity supplied is a function of price

  or

  quantity supplied depends on price
- This can be written as:

  $Q_s = f(P)$

- **The Supply Curve**
- Table 2.2 shows the monthly supply for Beef in Ireland at different prices
- Such a table is known as a supply schedule

Table 2.2: The Supply Schedule for Beef (per month)

Price (P)	Quantity Supplied (Qd) (000's of Kg's)
€5.00	1,000
€5.50	1,200
€6.00	1,400
€6.50	1,600
€7.00	1,800
€7.50	2,000
€8.00	2,200
€8.50	2,400
€9.00	2,600
€9.50	2,800

- **The Supply Curve**
- Table 2.2 shows the monthly supply for Beef in Ireland at different prices
- Such a table is known as a supply schedule
- From table 2.2 and ***diagram 6*** we can see a *positive relationship* between P and Qs
- *positive relationship*
  - a positive relationship is where two things move in the same direction
  - e.g. P⬆ and Qty Supplied⬆
  - e.g. P⬇ and Qty Supplied⬇

- We can convert this data into a supply curve (***diagram 6***) with:
  - Price (P) on the vertical axis
  - Quantity (Q) on the horizontal axis
- This gives an upward sloping supply curve

- An Exception (short-run)
  - Generally, this relationship holds true
  - An exception is a kinked supply curve
  - Here, the supply curve initially slopes upwards
  - At a particular quantity (Q*) it goes vertical
  - ***Diagram 7***
  - Beyond Q* firms cannot produce more goods even when P⬆
  - Reasons x3
    - (i) plant size
    - (ii) access to raw materials
    - (iii) availability of skilled labour

- ***Factors Influencing Supply***
  - Besides price, 6 other factors influence the quantity of a good supplied
  - These are:

(i) Technology (Tec)

- A supply curve is drawn based on the current level of technology
- If a technological improvement occurs then suppliers can use inputs more efficiently
- e.g. improved machinery , new work practices
- This will allow supply to improve

(ii) Input Prices (P_{inputs})

- If input prices change then this will affect supply
- If they fall it induces suppliers to supply more output at each price
- e.g. ⬇ in the price of flour for the baker
- vice versa

(iii) Government Regulations (G)

- These can alter production method and affect supply
- Reduction in the no. of hours worked each week could ⬇S
- Safety regulations which reduce accidents and improve health levels could ⬆S

(iv) Taxes (Tax)

- Taxes on wages, inputs etc can increase the cost of production and impact negatively on the qty of goods supplied at each price
- Tax reductions can have the opposite effect

(v) Subsidies (Sy)

- Government subsidies ⬇ the cost per unit and encourage more supply
- e.g. European agricultural production

(vi) Other Factors (O)

- There are many other factors that influence supply
- Such as: the price of other commodities, expectations of the future, climate,…

- Overall, supply for a good is influenced by all these factors
- We can re-write the supply function with these as:

$$Qs = f(P, Tec, P_{inputs}, G, Tax, Sy, O)$$

- If we want to examine the relationship between Qs and P, we can assume that all other things remain unchanged (*ceteris paribus*)

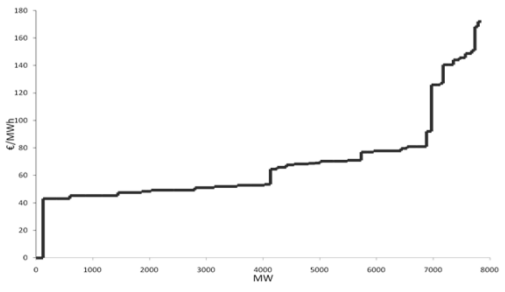
- ***A movement along a Supply Curve***
  - A movement along a supply curve is caused by a change in price
  - Say the price of beef increases from €7.00 to €7.50 per kg
  - The quantity supplied will increase
  - ***Diagram 8***
  - Moving from point A to point B along the supply curve means that the Qs increases to 2,000,000 kg per month

- **A shift of the Supply Curve**
  - This occurs if one of the conditions of supply changes
  - These are: Tec, P_{inputs}, G, Tax, Sy, O
  - If one of these changes then each single point on the supply curve shifts/moves either out to the right or in to the left
  - For example: an ⬇P_{inputs}
  - Now can produce at lower cost and so supply more at each price level
  - This causes the curve to shift out (to S1)
  - Previously Q* was demanded at P*, now Q1 is demanded at P*
  - ***Diagram 9*** (opposite ***Diagram 10***)

- An outward shift in the supply curve
  - Technological improvement
  - ⬇Pinputs
  - G which causes a cost saving
  - ⬇Tax levels
  - ⬆ Subsidies (Sy)

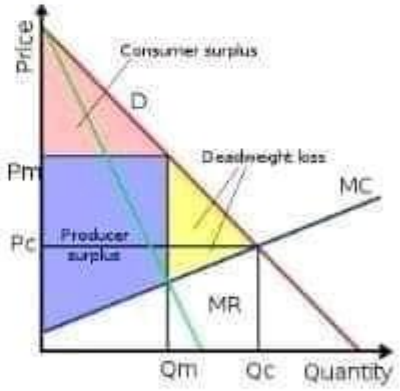
- An inward shift in the supply curve
  - ⬆Pinputs
  - G which causes a cost increases
  - ⬆ Tax levels
  - ⬇ Subsidies (Sy)

Ireland's Electricity Supply Curve



Economic Formulas

- Total Revenue $TR = P \times Q$
- Marginal Revenue $MR = \frac{\Delta TR}{\Delta Q}$
- Total cost $TC = FC \times VC$
- Marginal cost $MC = \frac{\text{(change in total cost)}}{\text{(change in quantity)}} = \frac{\Delta TC}{\Delta Q}$
- Average variable cost $AVC = VC/Q$
- Average fixed cost $AFC = FC/Q$
- Average total cost $ATC = ATC / Q$ or $ATC = AFC + AVC$
- Average Revenue $P = AR = TR/Q$ $AR = \frac{P \times Q}{Q} = P$
  - For a competitive firm, price equals marginal cost. $P = MR = MC$
  - For a monopoly firm, price exceeds marginal cost. $P > MR = MC$
- Profit = TR - TC
- Profit = (TR/Q - TC/Q) × Q
- Profit = (P - ATC) × Q
- When MR > MC ⇒ increase Q
- When MR < MC ⇒ decrease Q
- When MR = MC ⇒ Profit is maximized.
- Shut down if TR < VC
- Shut down if TR/Q < VC/Q
- Shut down if P < AVC
- Exit if TR < TC
- Exit if TR/Q < TC/Q



9. Consumer and Producer Surplus

Price is determined by the interaction of **demand** and **supply**. But we don't always pay the **maximum price that we are willing to pay**...often we get a bargain!

Its all about **value** **(for consumers)** and **cost** **(for producers)**

Value of one more unit of a good/service is its **marginal** (extra) **benefit (MB).** This 'willingness to pay' determines demand

Demand curve = **MB** curve

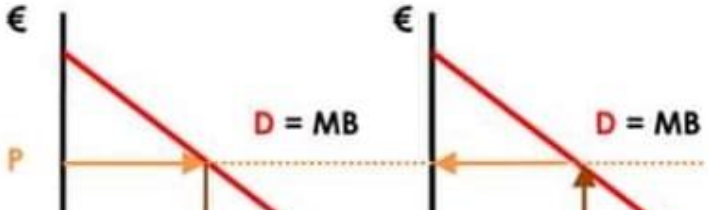
When consumers buy something for **less than its worth** to them, they receive a **consumer surplus**

Cost of producing one more unit of a good/service is its **marginal** (extra) **cost (MC).** This 'willingness to produce' determines supply

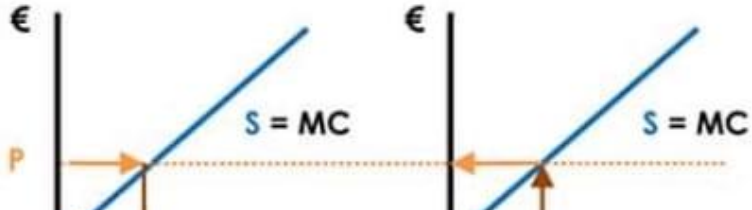
Supply curve = **MC** curve

When producers supply something for more than the **marginal cost of production**, they receive a **producer surplus**

Consumer Surplus



Producer Surplus



(i) PRICE ELASTICITY OF DEMAND

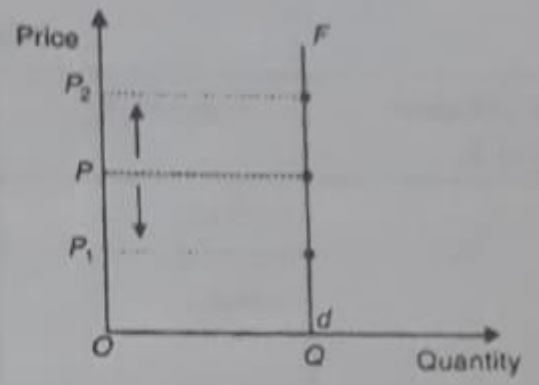
It may be defined as the degree of responsiveness of quantity demanded of a commodity in response to change in its price. Therefore the price elasticity of demand refers to the ratio of the percentage change in the quantity demanded of a commodity to given percentage change in its price.

$$E_p = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

Different Types of Price Elasticity of Demand. Price elasticity of demand may be expressed in terms of its numerical value. The numerical value of price elasticity of demand ranges from zero to infinity. In terms of its numerical value i.e. the degree of elasticity there are five types of price elasticity of demand.

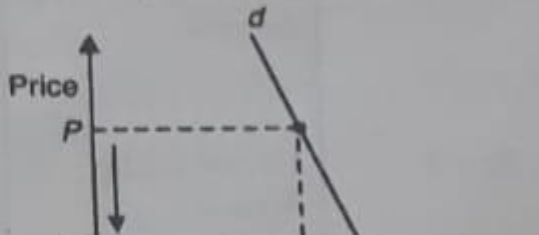
1. ***Perfectly Inelastic Demand*** ***($E_d = 0$)*** : When the demand of a commodity does not change as a result of change in its price, the demand is said to be perfectly inelastic i.e. zero. The perfectly inelastic demand curve is a vertical line parallel to Y axis.

Price (Rs.)	Demand (units)
15	10
10	10
20	10



Perfectly inelastic Demand Curve

2. ***Inelastic Demand*** ***($E_d < 1$)*** : Demand is inelastic when the percentage change in quantity demanded of a commodity is less than the percentage change in its price. When a considerable change in price leads to less than proportionate change in demand, the demand is said to be less elastic or inelastic.



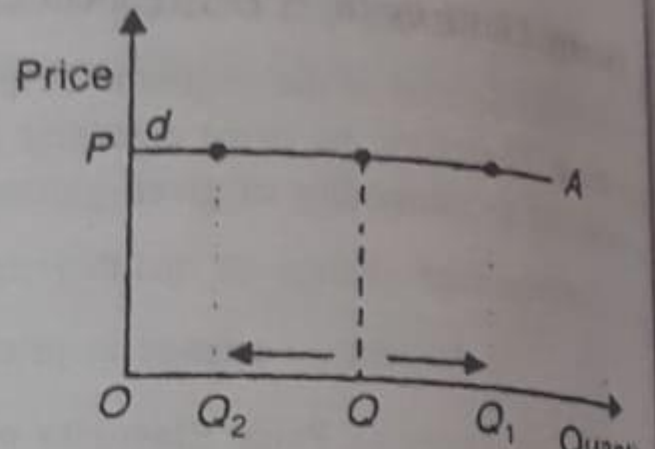
What are ‘bads’ in economics?

“BADS” in economics are commodities that lowers a consumer’s level of happiness as their consumption increases i.e. their consumption has a negative effect on utility of a consumer. For example, air pollution, traffic congestion, passive smoking etc.

Also, GOODS (commodities that give positive marginal utility) can transform to BADS (commodities that give negative marginal utility) after a point of time.

5. *Perfectly elastic demand (Ed = ∞)* : When consumers are prepared to purchase all that they can get at a particular price but nothing at all at a slightly higher price, then the price elasticityof demand for a commodity is said to be infinite. When the demand for a commodity rises or falls to any extent without any change in price, the demand for the commodity is said to be perfectly elastic.

Price (Rs.)	Demand (Units)
10	10
10	5
10	20



Perfectly Elastic Demand Curve

Different Values of Elasticity of Demand

Coefficient of E_d	Types of E_d	Description	Type of Goods	Shape of Demand Curve
1. $E_d = 0$	Perfectly inelastic demand	This occurs when to a percentage change in price there is no change in quantity demanded.	Essentials like life saving drugs	Vertical
2. $0 < E_d < 1$	Inelastic (or less than unitary elastic) demand	This occurs when to a percentage change in	Necessities like food, fuel	Steeper

Economic Formulas

- Total Revenue $TR = P \times Q$
- Marginal Revenue $MR = \frac{\Delta TR}{\Delta Q}$
- Total cost $TC = FC \times VC$
- Marginal cost $MC = \frac{\text{(change in total cost)}}{\text{(change in quantity)}} = \frac{\Delta TC}{\Delta Q}$
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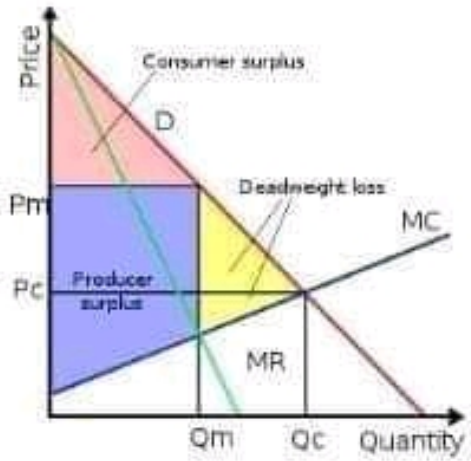
- Exit if P < ATC
- Enter if TR > TC
- Enter if TR/Q > TC/Q
- Enter if P > ATC



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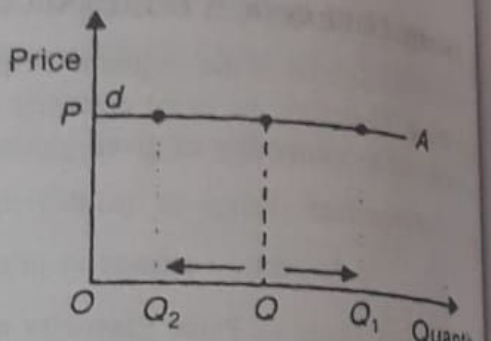

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3. $E_d = 1$	Unitary elastic demand	This occurs when to a percentage change in price there is equal change in quantity demanded.	Normal goods	The linear demand curve forming 45° angle with both the axes
4. $1 < E_d < \infty$	Elastic (or more than unitary elastic) demand	This occurs when to a percentage change in price there is more than proportionate change in quantity demanded	Luxuries	Flatter *(dB)*
5. $E_d = \infty$	Perfectly elastic demand	This occurs when there is infinite change in quantity demanded without any change in price.	Imaginary situation	Horizontal

Methods for Calculating Price Elasticity of D

What are ‘bads’ in economics?

“BADS” in economics are commodities that lowers a consumer’s level of happiness as their consumption increases i.e. their consumption has a negative effect on utility of a consumer. For example, air pollution, traffic congestion, passive smoking etc.

Also, GOODS (commodities that give positive marginal utility) can transform to BADS (commodities that give negative marginal utility) after a point of time.

Take the case of a glass of milk. When you are hungry and have the first glass, you feel happy and satisfied. However, any extra glass forced upon you after that when you are no more hungry might become bad to you.

In addition to that, a commodity can be a good or a bad depending upon people’s preferences. Olives on a pizza slice can be a good or a bad in view of whether a person likes having them or not.

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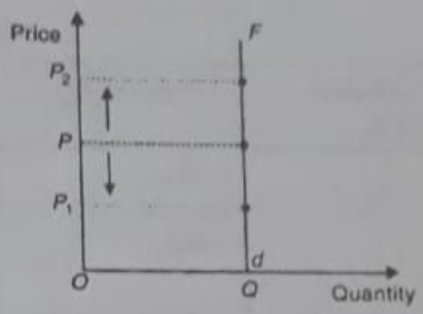
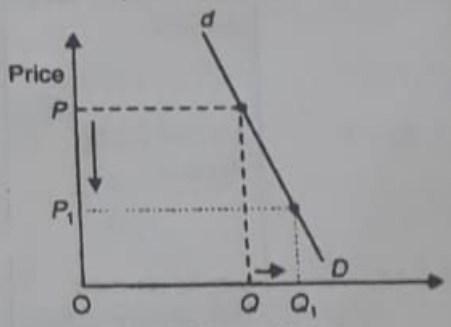


Perfectly inelastic Demand Curve

2. ***Inelastic Demand*** ***($E_d < 1$)*** : Demand is inelastic when the percentage change in quantity demanded of a commodity is less than the percentage change in its price. When a considerable change in price leads to less than proportionate change in demand, the demand is said to be less elastic or inelastic.

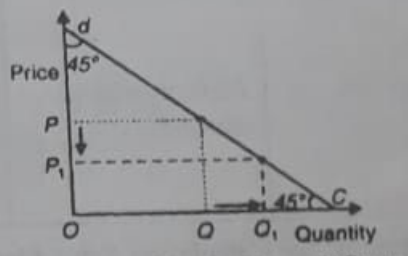
Price (Rs.)	Demand (Units)
10	20
2	21



Inelastic Demand Curve

3. ***Unitary Elastic Demand*** ***($E_d = 1$)*** : When the given percentage change in demand is equal to the percentage change in price, the demand for the commodity is said to be unitary elastic.

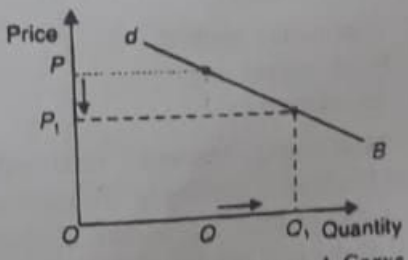
Price (Rs.)	Demand (Units)
10	20
5	30



Unitary Elastic Demand Curve

4. ***Elastic Demand*** ***($1 < E_d < \infty$)*** : When a small change in price leads to a more than proportionate change in demand, the demand is said to be elastic or more than unit elastic. The coefficient of elasticity of demand is greater than unity.

Price (Rs.)	Demand (Units)
10	20
9	40



Elastic Demand Curve

9. Consumer and Producer Surplus

Price is determined by the interaction of **demand** and **supply**. But we don't always pay the **maximum price that we are willing to pay**...often we get a bargain!

Its all about **value** **(for consumers)** and **cost** **(for producers)**

Value of one more unit of a good/service is its **marginal** (extra) **benefit (MB).** This 'willingness to pay' determines demand

Demand curve = **MB** curve

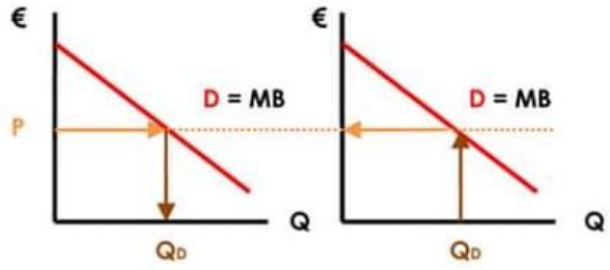
When consumers buy something for **less than its worth** to them, they receive a **consumer surplus**

Cost of producing one more unit of a good/service is its **marginal** (extra) **cost (MC).** This 'willingness to produce' determines supply

Supply curve = **MC** curve

When producers supply something for more than the **marginal cost of production**, they receive a **producer surplus**

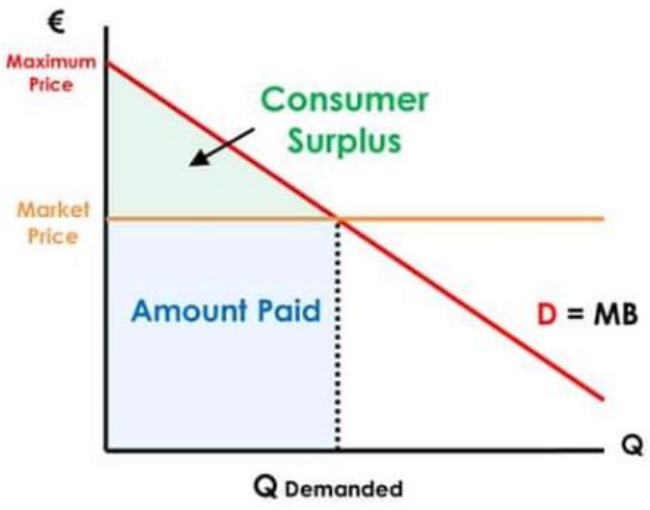
Consumer Surplus



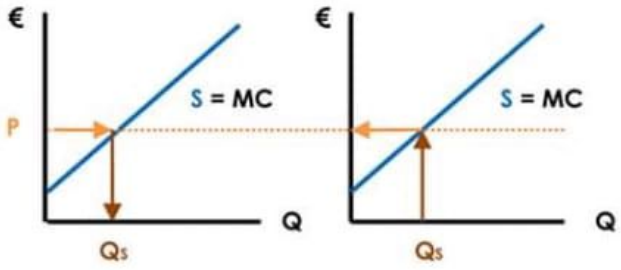
Price (P) determines **Quantity Demanded**

@P, Q_D is **demanded**

Quantity Demanded determines **willingness to pay** (Maximum price)



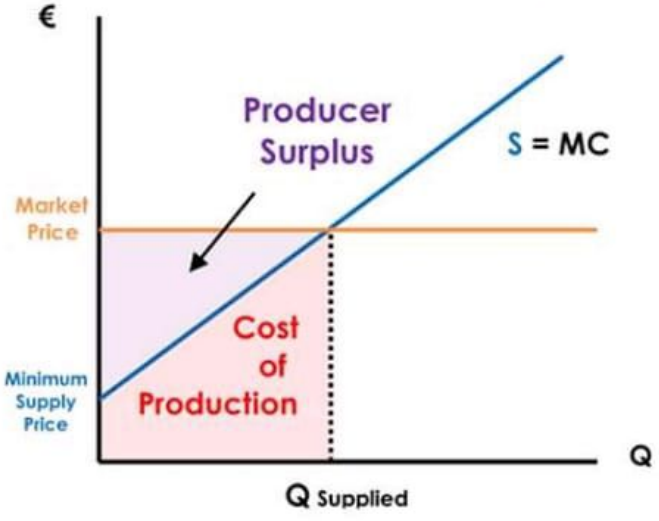
Producer Surplus



Price (P) determines **Quantity Supplied**

@P, Q_S is **Supplied**

Quantity Supplied determines **willingness to produce** (Maximum supply price)



of indifference curves which is based onthe ordinal utility and so extensively used now. The Indifference Curve Analysis is more scientific and exact techniqueof explaining consumer's equilibrium than the utility Analysis. The MarshallianUtility Analysis proceeds on the basis that there is only one commodity whichan individual consumer will buy at a time and the utility of the commodity is measurable. These assumptions are not real because consumers are usuallyinterested in a combination of related goods. Moreover, this analysis assumesthat utilities of different commodities can be measured. This is difficult, if notimpossible. It is, therefore, better to have an analysis which avoids thesedifficulties. The Indifference Curve Analysis seeks to achieve this objective. Moreover, it makes itpossible to distinguish clearly the income and substitutioneffects of a change in the price of purchased goods.

Indifference curves are based on ordinal utility. It implies that differentcommodities can be ranked in order of utility, without measuring utility. Theexact difference between the utilities of two commodities cannot be told.

Assumptions: The difference Curve Analysis is based on the following important assumptions:

(i) The consumer possesses full knowledge about all matters connectedwith his consumption decisions. For example, he knows the complete range of goods and services available in the market. He also knows the technical capacityof each commodity to satisfy his want. He has the information about the pricesof various goods and services.

(ii) Every consumer has a scale of ordered preferences which enables himto compare any two combinations of two goods and to decide whether or not a given combination of any two goods is preferred, not preferred or equivalentto any other combination of goods.

(iii) The indifference curve analysis assumes that the consumer is notinterested in any one commodity at a particular time as asserted by utility analysis,but he is interested in a combination of goods and with that given by other.

(iv) The indifference curve analysis also assumes that the consumer acts in a rational manner.

An indifference curve can be defined as the locus of points each representing a different combination of two goods yielding the same utility or level of satisfaction. Therefore, a consumer is indifferent between any two combinations of goods when it comes to making a choice between them. Such a situation arises because a consumer consumes a large number of goods and services, and often he finds that one commodity serves as a substitute for another. This gives him an

opportunity to substitute one commodity for another. In that case, he is able to make various combinations of two substitute goods which give him the same level of satisfaction. When a consumer is faced with such combinations of goods, he would be indifferent between the combinations. When such combinations are plotted graphically, it results into a curve. This curve is knownasindifference curve.Indifference curves are also called iso-utility curves and equal utility curves.

For the purpose of drawing an indifference curve, we require an indifference schedule. An indifference schedule may be defined as a schedule of variouscombinations of the two commodities that will equally be acceptable to theconsumer.With the help of the schedule, the indifference curve can be drawn.

Suppose the consumer is asked to tell all those combinationsof the two goods X andY which bring an equal amount of satisfaction to him.And suppose that the combinations formed by the consumer are such as indicated by the following table 2.4:

TABLE 2.4: Indifference Schedule

Combination	Commodity X	Commodity Y	Rate of Substitution
A	1	14	---
B	2	10	1:4
C	3	7	1:3
D	4	5	1:2
E	5	4	1:1

The above are the various combinations of X and Y giving the samesatisfaction to the consumer. When differentcombinations give equal satisfaction,it matters little to the consumer whether he chooses one combination or theother. From the above table, various combinations of equal preference can be made thus:

(a) 1 unit of X + 14 units of Y
(b) 2 units of X + 10 units of Y
(c) 3 units of X + 7 units of Y
(d) 4 units of X + 5 units of Y and so on

When we plot these five combinations, we get an indifference curve ICas shown in the given fig. 2.4. The curve is called the 'Indifference Curve' forit implies that the consumer is indifferent about the selection of any particularcombination of X andY since all of them yield an equal amount of satisfaction.

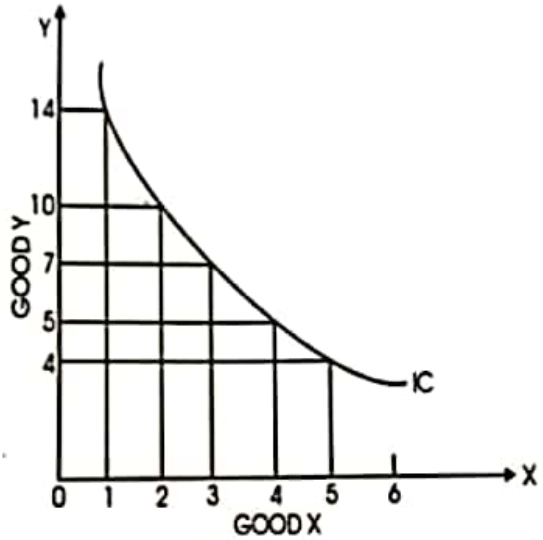


Figure 2.4

He has no preference for any of the five combinations over the rest four takenindividually. This curve is also called Iso-utility Curve i.e. every point on thecurve will give the same satisfaction (total utility) to the consumer, even thougheach point represents a separate combination of two commodities. Thus,indifference curve is a geometrical expression of the indifference schedule onthe assumption that the commodities constituting the combinations of eachschedule are finitely divisible. The curve does not indicate the amount of utilitythe consumer gets from the consumption of the various combinations of X andY. All that it shows is that the utility, whatever it may be, is the same for allthe combinations represented by the Curve IC.It may be mentioned here that a given indifference curve indicates givenamount of satisfaction and for representing a less or greater amount of satisfactiona separate indifference curve would be required. Any diagram which containsseveral indifference curves is called, 'Indifference Map'. The indifference map is shown in the fig 2.4a:

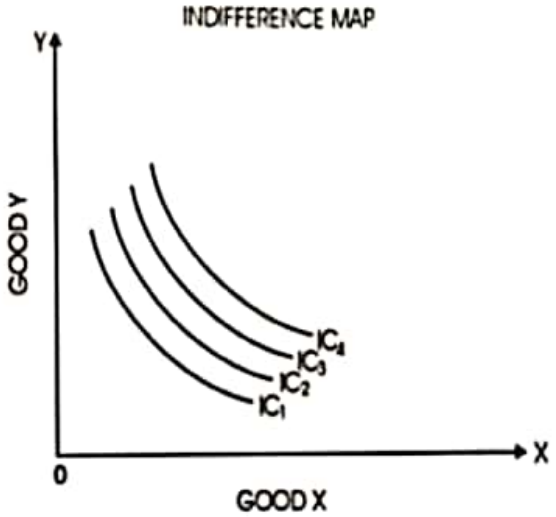


Figure 2.4a

The indifference curve which is higher than and which lies to the right of another indifference curve is said to be denoting a greater amount ofsatisfaction. For example, the indifference curve IC_2, shows an amount ofsatisfaction greater than that shown by the curve IC_1. Similarly, the indifferencecurve lying lower and to left of anotherrepresents a less amount of satisfaction.The curve IC_2, certainly shows a satisfaction less than exhibited by the curveIC_3.

2.4.1) MARGTNAL RATE OF SUBSTTTUTTON (MRS):

The concept of Marginal Rate of Substitution (MRS) is an important tool of indifference curveanalysis. The rate at which the consumer is prepared to exchange goods X andY is known as MRS. In the schedule given earlier in Table 2.4, in the beginning, theconsumer gives up 4 units of Y for the gain of one additional unit of X and in this processhis level of satisfaction remains the same. It follows that one unit gain in X fullycompensates him for the loss of 4 units of Y. It means that at this stage, he isprepared to exchange 4 units of Y for one unit of X. Therefore, the MRS of XforYis4.In the words of J.R. Hicks, "we may define the MRS of X for Y as theamount ofY whose loss can just be compensated by a unit gain in X." In otherwords, MRS of X forY represents the amount of Y which the consumer hasto give up for the gain of one additional unit of X so that his level of satisfactionremains the same. Similarly, when the consumer moves from combination Bto C on his indifference schedule, he foregoes 3 units of Y for the additionalone unit gain in X. Therefore, the MRS of X for Y is 3. Likewise, when theconsumer moves from C to D and then from D to E in his indifference schedule the MRS of X for Y is 2 and 1 respectively.

An important principle of economic theory is that MRS of X for Y diminishes as more and more of good X is substituted for good Y. In otherwords, as the consumer has more and more of good X, he is prepared to foregoless and less of good Y. This is because the consumer's stock of X increasesand that of Y decreases. It means that the MRS of X for Y falls as consumer has more of X and less of Y.

Thefollowing three factors are responsible for diminishing marginal rate ofsubstitution:

i) the want for a particular good is satiable so that as the consumer has more and more of a good, the intensity of his want for that good, goes on declining. It is because of this fall in the intensity of want for the good say X, when its stock increases with the consumer, he is prepared to forego less and less of good Y for every increment in X. In the beginning when the consumer's stock of good Y is relatively large and his stock of good X is relatively small, consumer's marginal significance for good Y is low, while his marginal significance for X is high. Owing to higher marginal significance of good X and lower marginal significance of good Y in the beginning, the consumer will be willing to give up a large amount of Y for a unit increase in good X. But as the stock of good X increases and the intensity of desire for it falls his marginal significance for good X will diminish and, on the other hand, as the stock of good Y decreases, and the intensity of desire for it increases, his marginal significance for good Y will go up. As a result, therefore, as the individual substitutes more and more of X for Y he is prepared to give up less and less of Y for a unit increase in X.

ii) The second reason for the decline in marginal rate of substitution is that the goods are imperfect substitutes of each other. If two goods are perfect substitutes of each other then they are to be regarded as one and the same good and therefore, increase in the quantity of one and decrease in the quantity of the other would not make any difference in the marginal significance of the goods. Thus, in case of perfect substitutability of goods, the increase and decrease will be virtually in the same good which will cancel each other and, therefore, the marginal rate of substitution remains the same and does not decline.

iii) Thirdly, the principle of diminishing marginal rate of substitution will hold good only if the increase in the quantity of one good does not increase the want satisfying power of the other. If with the increase in the stock of good X, the want satisfying power of good Y increases, then greater and greater amount of good Y will be required to be given up for a unit increase in good X so that consumer's satisfaction remains the same.

Generally speaking, the rate of substitution as between any two goods will be diminishing. However, there are two exceptions. In the case of goodswhich are perfect substitutes like tea and coffee, the rate of substitution willnot diminish but will remain uniform or constant. An addition of one cup ofcoffee will be accompanied by a reduction of one cup of tea. The MRS willremain uniform in this case. Similarly, in the case of commodities which areof complementary nature, like left shoe and right shoe, fixed quantities of boththe shoes are essential to give some satisfaction. With the addition of one unitof left shoe, there should be an addition of one unit of right shoe as well if thesame amount of satisfaction has to be maintained. The rate of substitution, inthis case, will be infinite.Leaving aside these exceptions, MRS diminishes i.e., with the increase ingoods X there is decrease in goods Y. The indifference curve will slopedownwards, rather steeply in the beginning, but later at a lower rate, and finallyit will be nearly horizontal. That is, indifference curve will be convex.

2.5) PROPERTIES OF INDIFFERENCE CURVES:

Indifference curves havea number of important properties which are discussed below:

1. Each Indifference Curve slopes downwards from Left to Right: Thisproperty implies that an indifference curve has a negative slope. It is importantto know why an indifference curve slopes downward from left to right. Thereason is not difficult to seek. In fact, when the consumer wants to get thesame amount of satisfactionby getting more of the good Y, he will have to give upsome amount of the good X. By its definition, the indifference curve indicatesan equal amount ofsatisfaction throughout itslength and so taking moreof the goodYmeans takingless of the good X and vice-versa. Thus, the substitution ofone good for the other isresponsible for the downwardsloping indifference curve. We canillustrate the point diagrammaticallyas well.

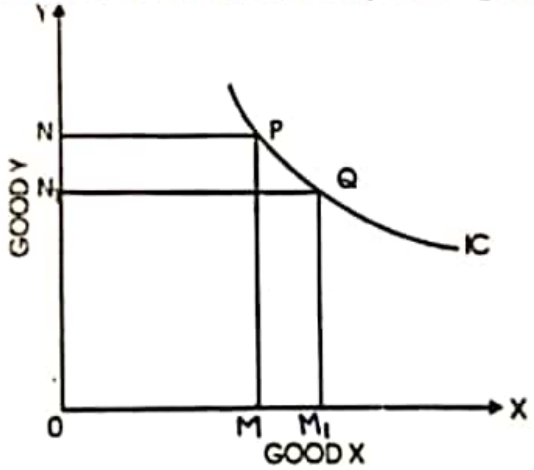


Figure2.5.1

The Fig.2.5.1 shows thatthe consumer has to surrender NN_1units ofY for taking MM_1additionalunits of X. It seems obviously reasonable to assume that consumerwould be obtaining the sameamount of satisfaction by addingmore units of the stock of X only when he had given up some unitsofY.

Now suppose indifferencecurve instead of being a downwardsloping curve, is Parallel to theX-axis, it will not satisfy theassumption mentioned above. Thisis explained in the diagram 2.5.1a, wheretwo combinations are representedby the points P and Q.

The combination at the PointP = OM of X + ON_1 of Y

The combination at the PointQ = $OM_1$of X + ON_1 of Y

Since $OM_1 > OM$

∴The satisfaction at Q > thesatisfaction at P. It is, therefore clearthat when one of the two pointsshows a greater amount ofsatisfaction than the other the pointcannotbe on one indifference curve.It means that no indifference curvecan be parallel to the X-axis.

Similarly, the indifferencecurve cannot be a vertical straightline, for vertical straight line wouldmean that while the amount of goodY in the combination increases, theamount of good X remains thesame. As the consumermoves frompoint P to Q, the amount of good X remains the same while the amount of goodY increases and therefore, gets more satisfaction at the point Q than at pointP. This goes against the principle of indifference curve technique. This isexplained in the diagram 2.5.1b.

Finally, we must consider an upward sloping indifference curve as depicted in the diagram 2.5.1c and see whether the same can be justified and held consistentwith the definition of the curve.

Here, the combination at a point P = $OM_1$of X + ON_1 of Y

and the combination at the point Q = OM_2 of X + ON_2 of Y

Since $OM_2 > OM_1$ and $ON_2 > ON_1$, the amount of satisfaction at the pointQ would definitely be greater than that at the point P. Clearly, the indifferencecurve cannot demonstrate two unequal amounts of satisfaction. In other words,the indifference curve cannot slope upwards from left to right. Thus, we see thatthe only possible andreasonable shape that the indifference curve in consistencewith its definition can take is one of downward sloping from left to right.

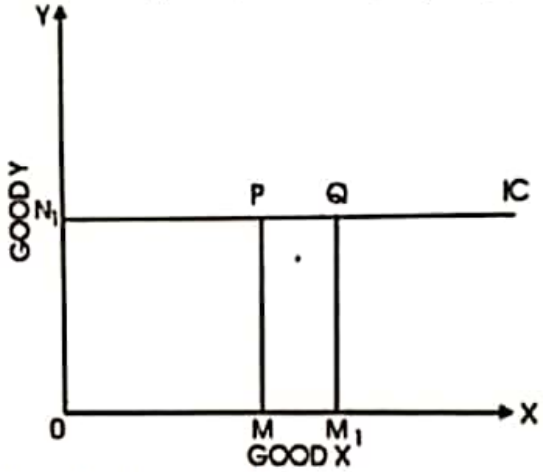


Fig. 2.5.1a

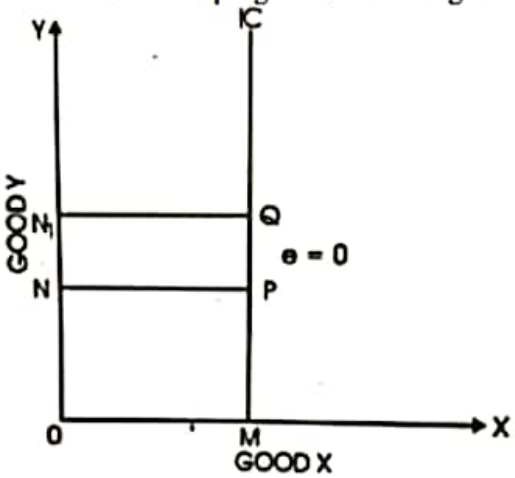


Fig. 2.5.1b

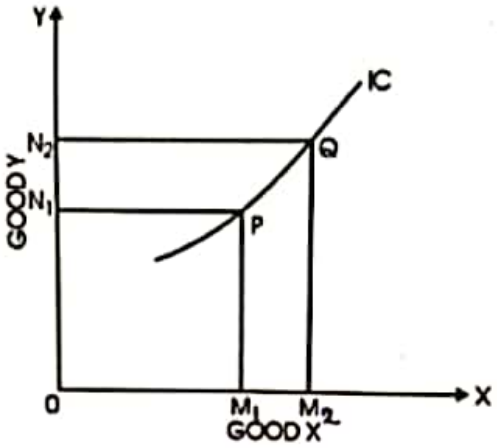
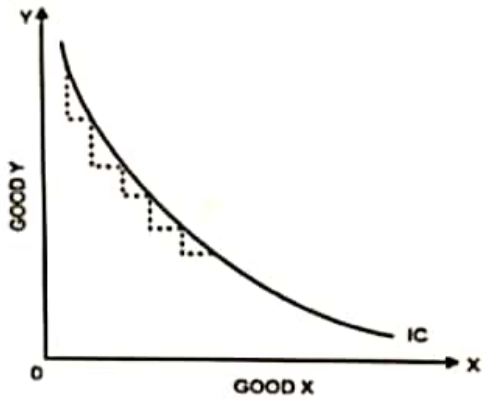


Fig. 2.5.1c

2. Indifference Curves are Convex to the Origin: Theassumption of an indifferencecurve being convex to the origin carries much economicsignificance. The convexity of the indifference curve to the origin can be attributed to Diminishing MRS. The left hand portion of the indifferencecurve is relatively steep and theright hand portion is relativelyparallel to the X-axis. Thisimplies the basic fact that moreof the stock of X the consumer acquires, the lesser in terms ofY he wants to surrender.Alternatively, it can be said that the marginal significance of X in terms of Ydecreases, with increase in the stock of X. This is due to the familiar fact thatthe marginal utility of acommodity decreases as we have more of it, and increasesas we have less of it. This is explained in the diagram 2.5.2. If the indifferencecurve is concave to the origin, it will imply that the MRS of X forY increasesas more and more of X is substituted for Y. It will be clear from the diagram 2.5.2a that as more and more of X is acquired, for each extra unit of X the consumeris willing to part with more and more of Y. It means that the MRS of X for Y increases as more and more of X is substituted for Y. If it is so, it is contrary to facts and violates the truththat lies behind the indifferencecurves analysis i.e.,Diminishing MRS. If theprinciple of diminishing MRSis valid then the indifferencecurve cannot be concave to theorigin.



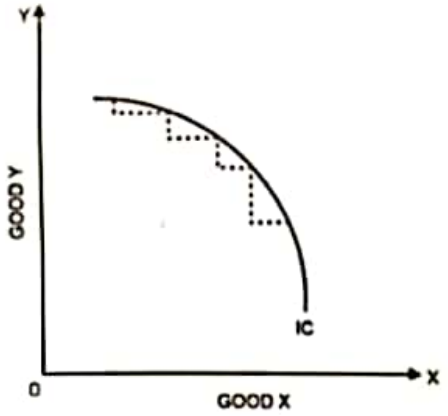
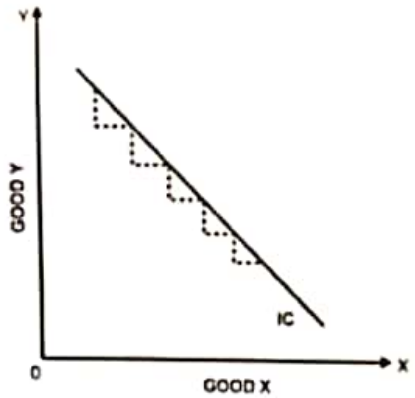


Fig. 2.5.2Fig. 2.5.2a

Let us consider anotherpossibility i.e. the indifferencecurve cannot be a downwardsloping straight line exceptwhen goods are perfectsubstitutes. A straight lineindifference curve would meanthat MRS of X for Y remainsconstant as more units of X are acquired in place of Y. Straight line indifferencecurve of perfect substitutes is shown in the diagram 2.5.2b. The better substitutesthe two goods are for each other, the close the indifferencecurve approaches to the straightline, so that when the two goodsare perfect substitutes, the indifference curve is a straightline. The consumer is indifferent, in such a case, as to which commodity he has. Generally, the indifferencecurve cannot be a straight linebecause perfect substitutes donot exist.

At the other extreme when two goods are notperfectsubstitutes and they areperfectly complementary, the indifference curve will consist of two straightlines with a right angle bend which is convex to the origin as shown in thediagram 2.5.2c, for example, pen and ink. Such goods are used orconsumed by the consumer in a certain fixed ratio and they cannot be substitutedfor each other.



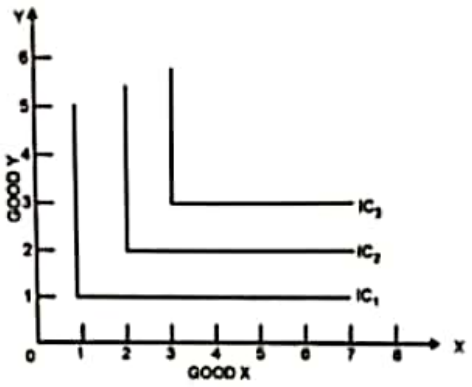


Fig. 2.5.2bFig. 2.5.2c

Perfect substitutes and perfect complements stand at opposite ends of thesubstitution scale. Even the concave position of the indifference curve is notpossible. Most of the cases are found between these alternatives for which indifference curves are convex to the origin.But the degree of convexity of an indifference curve depends upon theease or difficulty of substitution between the two goods.

3. Indifference Curves cannot intersect Each Other: Anotherimportant propertyof indifference curves is that they cannot intersect each other.In other words, onlyone indifferencecurve will passthrough apointin theindifference map. Let us for a momentgo against our this assumption andthink that the twoindifference curves can cut at point P as shown in diagram 2.5.3. Now since thepoints P and Q are on the same indifference curve IC_2, the amount of satisfaction at P = the amount of satisfaction at Q and similarly the amount of satisfaction at P = theamount of satisfaction at R because P and R, are on the same indifference curveIC_1. It follows that the amounts of

satisfaction at Q and R should also be equal. But they are not because Q is on a higher indifference curve and so shows agreater amount of satisfaction. Henceappears the logical contradiction if wethink against the assumption that two indifference curves cannot intersecteachother.

We can further explain this property with the help of indifferent combinations on the two curves.

Take IC_1, because P and R lie on the same indifference curve

$\therefore$OMof X+ONofY=$OM_1$of X+$ON_2$of Y .....(1)

Now take IC_2, because P and Q lie on the same curve

$\therefore$ OM of X + ON ofY = OM_1 of X + ON_1 ofY .....(2)

From the two equations (1) and (2), we get

OM_1 of X+ON_2 of Y = OM_1 of X + ON_1 of Y

Or ON_2 of Y = ON_1 of Y

This shows that $ON_2$of Y gives as much satisfaction to the consumer asON_1 of Y, which is totally wrong. Therefore, it can be said that the indifferencecurves cannot intersect each other.

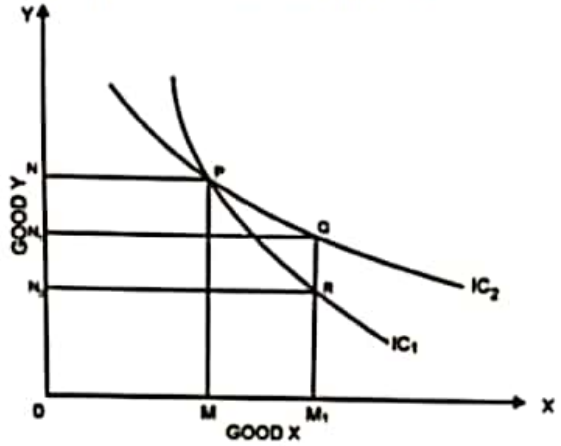


Fig. 2.5.3

4. Higher the Indifference curve, Higher is the Level of satisfaction: The indifference curve which is at a greater distance from the origin representshigher scale of preference. In other words, the combinations which lie on ahigher indifference curve will be preferred to the combinations which lie ona lower indifference curve. For example, as shown in the diagram 2.5.4 belowthe point Q is on the higher indifference curveIC_2, and point P is on the lowerindifference curve IC_1.

The combination at point Q will definitely give more satisfaction to theconsumer than the combination at point P, because the Q combination containsmore of both goods X and Y than the P combination. This proves that a higher indifference curve represents the higher level of satisfaction than thelower indifference curve.

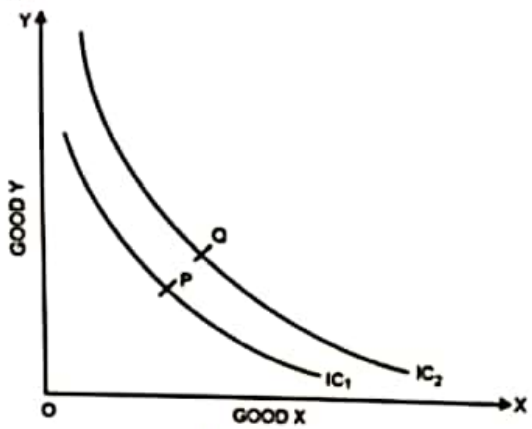


Fig. 2.5.4

5. Indifference Curve will not touch either X-axis or Y-axis: It is animportant characteristic of indifference curve. It will not touch either X-axisor Y-axis, as we have assumed that the individual is interested in differentcombinations of two commodities. If it touches either of theaxis, it will meanthat the consumer is interested in one commodity only. In the diagram 2.5.5, theindifference curve touches X-axis at point A and the Y-axis at point B. Thusat point A, he will be satisfied with OA units of X commodity, and has nopreference for Y commodity. Similarly at point B, he will have OB units of Y commodity and none of X. This normally does not happen. However, if oneof the commodities is money and it is shown on the Y-axis, it would be correctfor an indifference curve to touch Y-axis at point B. It would then mean thateither the consumer wants OB units of money only or some units of money andsome units of the other commodity. OB units of money only will give him the same satisfaction as a combination of a few units of money and some units ofthe other commodity.

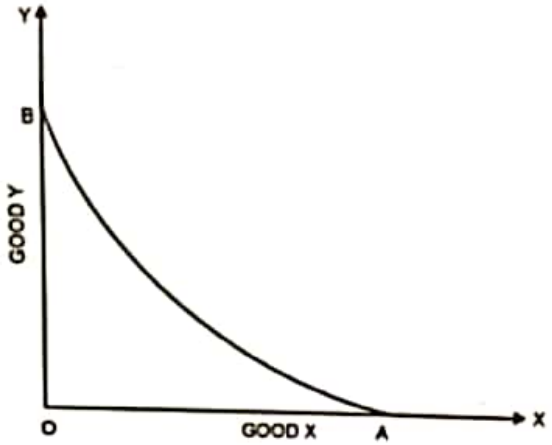


Fig. 2.5.5

6. Indifference Curves Need not be parallel to Each Other: This isbecause they are not based on the cardinal number system of measurability ofutility. Secondly, the rate of substitution between two commodities need not bethe same in all indifference schedules. From this it follows that indifferencecurves may be drawn in any way-- Parallel to each other or otherwise. The only condition is that the two indifference curves should not touch or cut each other. This is explained in the given diagram 2.5.6.

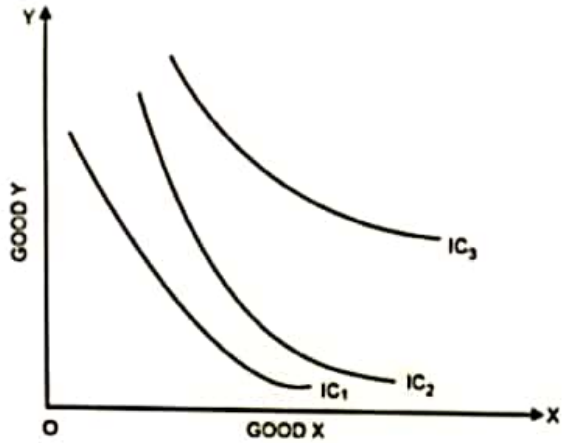


Fig. 2.5.6

Law of Variable Proportions: Meaning, Definition, Assumption and Stages:

Meaning:

Law of variable proportions occupies an important place in economic theory. This law examines the production function with one factor variable, keeping the quantities of other factors fixed. In other words, it refers to the input-output relation when output is increased by varying the quantity of one input

When the quantity of one factor is varied, keeping the quantity of other factors constant, the proportion between the variable factor and the fixed factor is altered; the ratio of employment of the variable factor to that of the fixed factor goes on increasing as the quantity of the variable factor is increased.

Since under this law we study the effects on output of variation in factor proportions, this is also known as the law of variable proportions. Thus law of variable proportions is the new name for

the famous "Law of Diminishing Returns" of classical economics. This law has played a vital role in the history of economic thought and occupies an equally important place in modern economic theory. This law has been supported by the empirical evidence about the real world.

The law of variable proportions or diminishing returns has been stated by various economists in the following manner: As equal increments of one input are added; the inputs of other productive services being held constant, beyond a certain point the resulting increments of product will decrease, i.e., the marginal products will diminish," (G. Stigler)

"As the proportion of one factor in a combination of factors is increased, after a point, first the marginal and then the average product of that factor will diminish." (F. Benham)

"An increase in some inputs relative to other fixed inputs will, in a given state of technology, cause output to increase; but after a point the extra output resulting from the same addition of extra inputs will become less." (Paul A. Samuelson)

Marshall discussed the law of diminishing returns in relation to agriculture. He defines the law as follows: "An increase in the capital and labour applied in the cultivation of land causes in general a less than proportionate increase in the amount of product raised unless it happens to coincide with an improvement in the arts of agriculture."

It is obvious from the above definitions of the law of variable proportions (or the law of diminishing returns) that it refers to the

behaviour of output as the quantity of one factor is increased, keeping the quantity of other factors fixed and further it states that the marginal product and average product will eventually decline.

Assumptions of the Law; The law of variable proportions or diminishing returns ,as stated above, holds good under the following conditions: 1. First, the state of technology is assumed to be given and unchanged. If there is improvement in the technology, then marginal and average products may rise instead of diminishing.

2. Secondly, there must be some inputs whose quantity is kept fixed. This is one of the ways by which we can alter the factor proportions and know its effect on output. This law does not apply in case all factors are proportionately varied. Behaviour of output as a result of the variation in all inputs is discussed under "returns to scale".

3. Thirdly the law is based upon the possibility of varying the proportions in which the various factors can be combined to produce a product. The law does not apply to those cases where the factors must be used in fixed proportions to yield a product.

When the various factors are required to be used in rigidly fixed proportions, then the increase in one factor would not lead to any increase in output, that is, the marginal product of the factor will then be zero and not diminishing. It may, however, be pointed out that products requiring fixed proportions of factors are quiet

uncommon. Thus, the law of variable proportion applies to most of the cases of production in the real world.

The law of variable proportions is illustrated in Table 1.1.and Fig. 1.3. We shall first explain it by considering Table 1.1. Assume that there is a given fixed amount of land, with which more units of the variable factor labour, is used to produce agricultural output.

Table 1.1 Returns to labour

Units of Labour	*Total Product (Quintals)*	*Marginal Product (Quintals)*	*Average Product (Quintals)*
L	Q	$\frac{\Delta Q}{\Delta L}$	$\frac{Q}{L}$
1	80	80	80
2	170	90	85
3	270	100	90
4	368	98	92
5	430	62	86
6	480	50	80
7	504	24	72
8	504	0	63
9	495	-9	55
10	480	-15	48

With a given fixed quantity of land, as a farmer raises employment of labour from one unit to 7 units, the total product increases from 80 quintals to 504 quintals of wheat. Beyond the employment of 8 units of labour, total product diminishes. It is worth noting that up to the use of 3 units of labour, total product increases at an increasing rate.

This fact is clearly revealed from column 3 which shows successive marginal products of labour as extra units of labour are used. Marginal product of labour, it may be recalled, is the increment in total output due to the use of an extra unit of labour.

It will be seen from Col. 3 of Table 1.1, that the marginal product of labour initially rises and beyond the use of three units of labour, it starts diminishing. Thus when 3 units of labour are employed, marginal product of labour is 100 and with the use of 4th and 5th units of labour marginal product of labour falls to 98 and 62 respectively.

Beyond the use of eight units of labour, total product diminishes and therefore marginal product of labour becomes negative. As regards average product of labour, it risesupto the use of fourth unit of labour and beyond that it is falling throughout.

Three Stages of the Law of Variable Proportions:

The behaviour of output when the varying quantity of one factor is combined with a fixed quantity of the other can be divided into three distinct stages. In order to understand these three stages it is better to graphically illustrate the production function with one factor variable.

This has been done in Fig. 1.3. In this figure, on the X-axis the quantity of the variable factor is measured and on the Y-axis the total product, average product and marginal product are measured. How the total product, average product and marginal productof a variable factor change as a result of the increase in its quantity, that

is, by increasing the quantity of one factor to a fixed quantity of the others will be seen from Fig. 1.3.

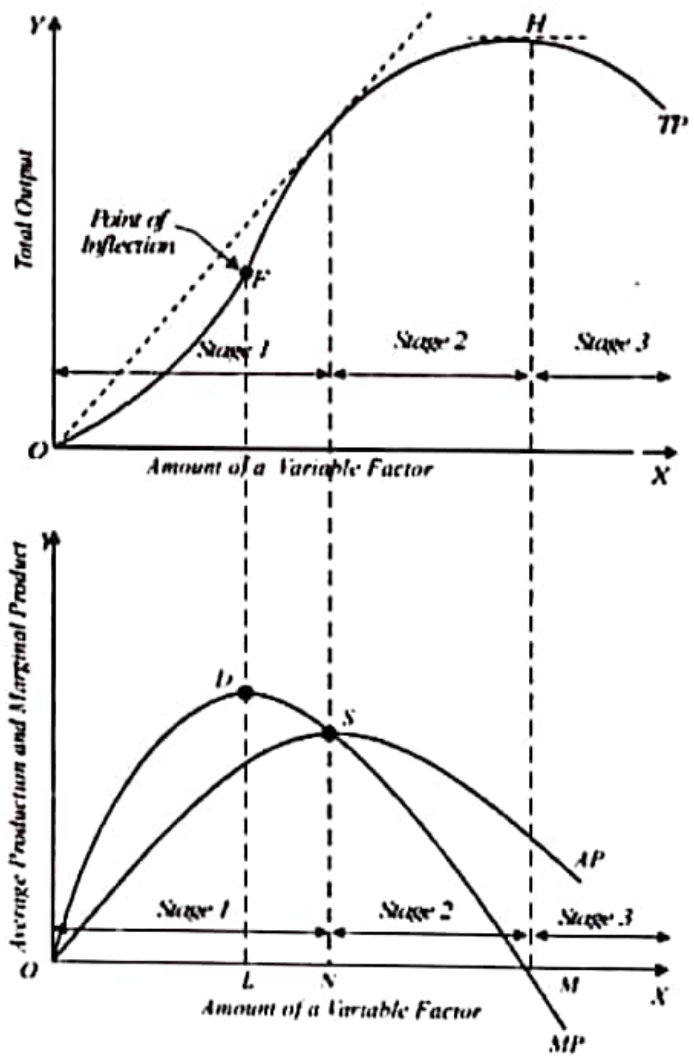


Figure 1.3 Three stages of law of variable proportions

In the top section of this figure, the total product curve TP of variable factor goes on increasing to a point and after that it starts declining. In the bottom section,

The behaviour of these total, average and marginal products of the variable factor as a result of the increase in its amount is generally divided into three stages which are explained as:

Stage 1: In this stage, total product curve TP increases at an increasing rate up to a point. In Fig. 1.3. from the origin to the point F, slope of the total product curve TP is increasing, that is, up to the point F, the total product increases at an increasing rate (the total product curve TP is concave upward upto the point F), which means that the marginal product MP of the variable factor is rising.

From the point F onwards during the stage 1, the total product curve goes on rising but its slope is declining which means that from point F onwards the total product increases at a diminishing rate (total product curve TP is concave down-ward), i.e., marginal product falls but is positive.

The point F where the total product stops increasing at an increasing rate and starts increasing at the diminishing rate is called the point of inflection. Vertically corresponding to this point of inflection marginal product is maximum, after which it starts diminishing.

Thus, marginal product of the variable factor starts diminishing beyond OL amount of the variable factor. That is, law of diminishing .returns starts operating in stage 1 from point D on the MP curve or from OL amount of the variable factor used.

This first stage ends where the average product curve AP reaches its highest point, that is, point S on AP curve or CW amount of the variable factor used. During stage 1, when marginal product of the

variable factor is falling it still exceeds its average product and so continues to cause the average product curve to rise.

Thus, during stage 1, whereas marginal product curve of a variable factor rises in a part and then falls, the average product curve rises throughout. In the first stage, the quantity of the fixed factor is too much relative to the quantity of the variable factor so that if some of the fixed factor is withdrawn, the total product will increase.

Stage 2:

In stage 2, the total product continues to increase at a diminishing rate until it reaches its maximum point H where the second stage ends. In this stage both the marginal product and the average product of the variable factor are diminishing but remain positive.

At the end of the second stage, that is, at point M marginal product of the variable factor is zero (corresponding to the highest point H of the total product curve TP). Stage 2 is very crucial and important because as will be explained below the firm will seek to produce in its range.

STAGE 3: Stage of Negative Returns:

In stage 3 with the increase in the variable factor the total product declines and therefore the total product curve TP slopes downward. As a result, marginal product of the variable factor is negative and the marginal product curve MP goes below the X-axis. In this stage the variable factor is too much relative to the fixed factor. This stage

Now, an important question is in which stage a rational producer will seek to produce. A rational producer will never choose to produce in stage 3 where marginal product of the variable factor is negative. Marginal product of the variable factor being negative in stage 3, a producer can always increase his output by reducing the amount of the variable factor

It is thus clear that a rational producer will never be producing in stage 3. Even if the variable factor is free, the rational producer will stop at the end of the second stage where the marginal product of the variable factor is zero.

At the end point M of the second stage where the marginal product of the variable factor is zero, the producer will be maximising the total product and will thus be making maximum use of the variable factor. A rational producer will also not choose to produce in stage 1 where the marginal product of the fixed factor is negative.

A producer producing in stage 1 means that he will not be making the best use of the fixed factor and further that he will not be utilising fully the opportunities of increasing production by increasing quantity of the variable factor whose average product continues to rise throughout the stage 1

Thus, a rational entrepreneur will not stop in stage 1 but will expand further.

Even if the fixed factor is free (i.e., costs nothing), the rational entrepreneur will stop only at the end of stage 1 (i.e., at point N) where the average product of the variable factor is maximum. At the end point N of stage 1, the producer they will be making maximum use of the fixed factor.

It is thus clear from above that the rational producer will never be found producing in stage 1 and stage 3. The stages 1 and 3 represent non-economic regions in production function.

A rational producer will always seek to produce in stage 2 where both the marginal product and average product of the variable factor are diminishing. At which particular point in this stage, the

Chapter 4 – Elasticity – Sample Questions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The slope of a demand curve depends on 1) _____
A) the units used to measure quantity but not the units used to measure price.
B) the units used to measure price and the units used to measure quantity.
C) the units used to measure price but not the units used to measure quantity.
D) neither the units used to measure price nor the units used to measure quantity.

2) The price elasticity of demand depends on 2) _____
A) the units used to measure price but not the units used to measure quantity.
B) the units used to measure price and the units used to measure quantity.
C) the units used to measure quantity but not the units used to measure price.
D) neither the units used to measure price nor the units used to measure quantity.

3) The price elasticity of demand measures 3) _____
A) the slope of a budget curve.
B) how often the price of a good changes.
C) the responsiveness of the quantity demanded to changes in price.
D) how sensitive the quantity demanded is to changes in demand.

4) When the quantity of coal supplied is measured in kilograms instead of pounds, the demand for coal becomes 4) _____
A) more elastic. B) neither more nor less elastic.
C) less elastic. D) undefined.

5) The price elasticity of demand equals 5) _____
A) the percentage change in the quantity demanded divided by the percentage change in the price.
B) the change in the quantity demanded divided by the change in price.
C) the percentage change in the price divided by the percentage change in the quantity demanded.
D) the change in the price divided by the change in quantity demanded.

6) If a rightward shift of the supply curve leads to a 6 percent decrease in the price and a 5 percent increase in the quantity demanded, the price elasticity of demand is 6) _____
A) 0.83. B) 0.30. C) 0.60. D) 1.20.

7) A 10 percent increase in the quantity of spinach demanded results from a 20 percent decline in its price. The price elasticity of demand for spinach is 7) _____
A) 0.5. B) 20.0. C) 2.0. D) 10.0.

8) A 20 percent increase in the quantity of pizza demanded results from a 10 percent decline in its price. The price elasticity of demand for pizza is 8) _____
A) 2.0. B) 10.0. C) 0.5. D) 20.0.

9) Suppose a rise in the price of peaches from $5.50 to $6.50 per bushel decreases the quantity demanded from 12,500 to 11,500 bushels. The price elasticity of demand is 9) _____

A) 0.5. B) 1000.0. C) 2.0. D) 1.0.

10) A fall in the price of lemons from $10.50 to $9.50 per bushel increases the quantity demanded from 19,200 to 20,800 bushels. The price elasticity of demand is 10) _____

A) 1.25. B) 1.20. C) 8.00. D) 0.80.

11) A fall in the price of cabbage from $10.50 to $9.50 per bushel increases the quantity demanded from 18,800 to 21,200 bushels. The price elasticity of demand is 11) _____

A) 1.20. B) 0.80. C) 8.00. D) 1.25.

12) Suppose that the quantity of root beer demanded declines from 103,000 gallons per week to 97,000 gallons per week as a consequence of a 10 percent increase in the price of root beer. The price elasticity of demand is 12) _____

A) 1.66. B) 6.00. C) 0.60. D) 1.40.

13) The price elasticity of demand is 5.0 if a 10 percent increase in the price results in a _____ decrease in the quantity demanded. 13) _____

A) 10 percent B) 50 percent C) 2 percent D) 5 percent

14) A shift of the supply curve of oil raises the price of oil from $9.50 a barrel to $10.50 a barrel and reduces the quantity demanded from 41 million to 39 million barrels a day. The price elasticity of demand for oil is 14) _____

A) 2 million barrels a day per dollar. B) 0.5.

C) $1 per 2 million barrels a day. D) 2.0.

Price (dollars per bushel)	Quantity demanded (bushels)
8	2,000
7	4,000
6	6,000
5	8,000
4	10,000
3	12,000

15) The table above gives the demand schedule for snow peas. The price elasticity of demand between $6.00 and $7.00 per bushel is 15) _____

A) 1.0. B) 5.0. C) 2.0. D) 2.6.

16) The table above gives the demand schedule for snow peas. If the price of snow peas falls from $4.00 to $3.00 a bushel, total revenue will 16) _____

A) increase because demand is elastic in this range.

B) increase because demand is inelastic in this range.

C) decrease because demand is inelastic in this range.

D) decrease because demand is elastic in this range.

17) The table above gives the demand schedule for snow peas. The demand curve for snow peas is a straight line and so the elasticity of demand is 17) _____

A) lower at higher prices.
B) higher at higher prices.
C) 1 at all prices.
D) the same at all prices but not 1.

	Price (dollars per bushel)	Quantity demanded (bushels)
A	10	0
B	8	4
C	6	8
D	4	12
E	2	16

18) The table above gives the demand schedule for peas. As you move from point A to point B, the price elasticity of demand equals 18) _____

A) 0.50. B) 0.11. C) 9.09. D) 0.22.

19) The table above gives the demand schedule for peas. As you move from point C to point D, the price elasticity of demand is 19) _____

A) 3.00. B) elastic. C) 0.75. D) unit elastic.

20) The table above gives the demand schedule for peas. Which of the following statements correctly describes the price elasticity of demand? 20) _____

A) The price elasticity of demand is larger at point A than at point B.
B) The price elasticity of demand is constant because the slope is constant.
C) The price elasticity of demand increases moving from point A to point B to point C to point D to point E.
D) The price elasticity of demand is larger at point D than at point A.

21) If demand is price elastic, 21) _____

A) a 1 percent decrease in the price leads to an increase in the quantity demanded that exceeds 1 percent.
B) a 1 percent increase in the price leads to an increase in the quantity demanded that exceeds 1 percent.
C) the price is very sensitive to any shift of the supply curve.
D) a 1 percent decrease in the price leads to a decrease in the quantity demanded that is less than 1 percent.

22) The price elasticity of demand can range between 22) _____

A) negative one and one.
B) zero and infinity.
C) zero and one.
D) negative infinity and infinity.

23) Demand is perfectly inelastic when 23) _____

A) the good in question has perfect substitutes.
B) shifts in the supply curve results in no change in price.
C) shifts of the supply curve results in no change in quantity demanded.
D) shifts of the supply curve results in no change in the total revenue from sales.

24) If the price elasticity is between 0 and 1, demand is 24) _____

A) inelastic. B) elastic. C) perfectly elastic. D) unit elastic.

25) Demand is inelastic if 25) _____

A) a large change in quantity demanded results in a small change in price.

B) the price elasticity of demand is greater than 1.

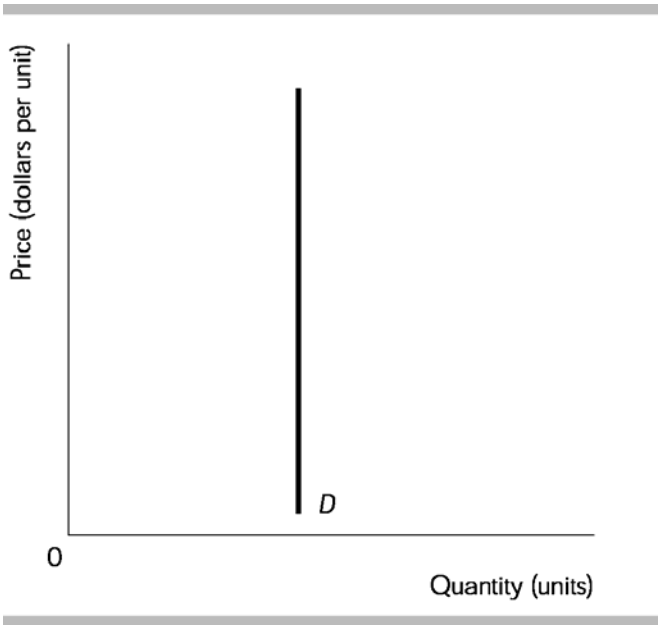
C) the quantity demanded is very responsive to changes in price.

D) the price elasticity of demand is less than 1.

26) A good with a vertical demand curve has a demand with 26) _____

A) infinite elasticity. B) unit elasticity.

C) zero elasticity. D) varying elasticity.



27) The demand curve in the figure above illustrates the demand for a product with 27) _____

A) unit price elasticity of demand at all prices.

B) a price elasticity of demand that is different at all prices.

C) infinite price elasticity of demand.

D) zero price elasticity of demand at all prices.

28) When the price elasticity of demand for a good equals 28) _____

A) 0, the demand curve is horizontal. B) 1, the demand curve is vertical.

C) 1, the demand curve is horizontal. D) 0, the demand curve is vertical.

29) A straight–line demand curve along which the price elasticity of demand equals 0 is one that 29) _____

A) forms a 45 degree angle with the vertical axis.

B) is horizontal.

C) is vertical.

D) forms a 60 degree angle with the horizontal axis.

30) The demand for movies is unit elastic if 30) _____

A) any increase in the price leads to a 1 percent decrease in the quantity demanded.

B) a 5 percent decrease in the price leads to an infinite increase in the quantity demanded.

C) a 5 percent increase in the price leads to a 5 percent decrease in the quantity demanded.

D) a 5 percent increase in the price leads to a 5 percent increase in total revenue.

31) Unit elastic demand 31) _____

A) means that the ratio of a change in the quantity demanded to a change in the price equals 1.

B) will be vertical.

C) means that the ratio of a percentage change in the quantity demanded to a percentage change in the price equals 1.

D) will be horizontal.

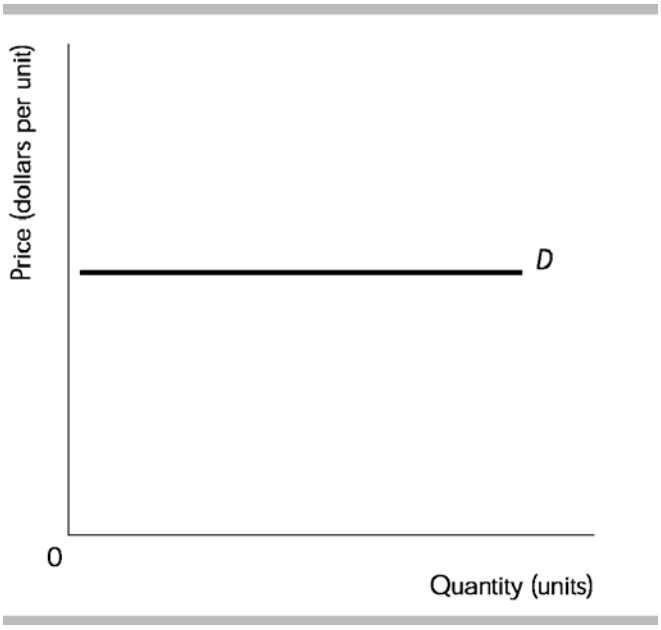
32) A good with a horizontal demand curve has a demand 32) _____

A) with an income elasticity of demand of 0.

B) with a price elasticity of demand of infinity.

C) for which there are no substitute.

D) with a price elasticity of demand of 0.



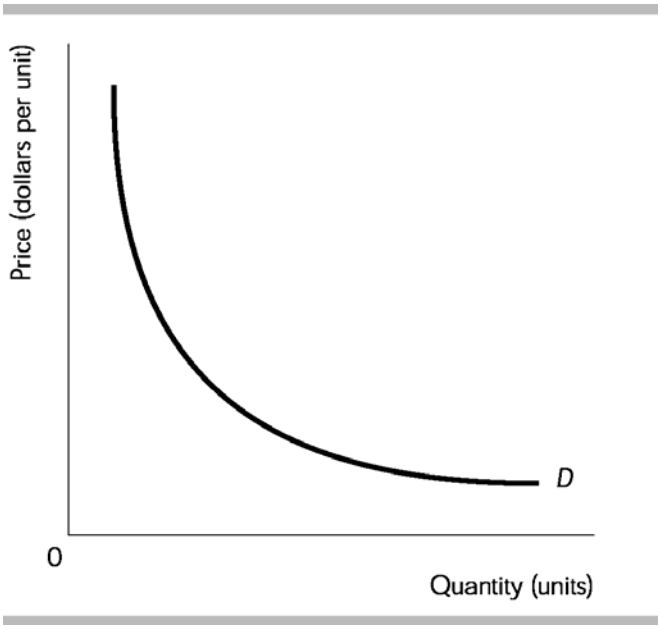
33) The demand curve in the figure above illustrates a product whose demand has a price elasticity of demand equal to 33) _____

A) infinity.

B) zero at all prices.

C) a different amount at different prices.

D) one at all prices.



34) The demand curve in the figure above illustrates the demand for a product with 34) _____

A) zero price elasticity of demand at all prices.

B) a price elasticity of demand that is different at all prices.

C) unit price elasticity of demand at all prices.

D) infinite price elasticity of demand.

35) On a linear demand curve that intersects both axes, 35) _____

A) the elasticity decreases as the price falls and quantity increases.

B) the elasticity is less than 1.00 at all prices.

C) the elasticity equals 1.00 at all prices.

D) the elasticity exceeds 1.00 at all prices.

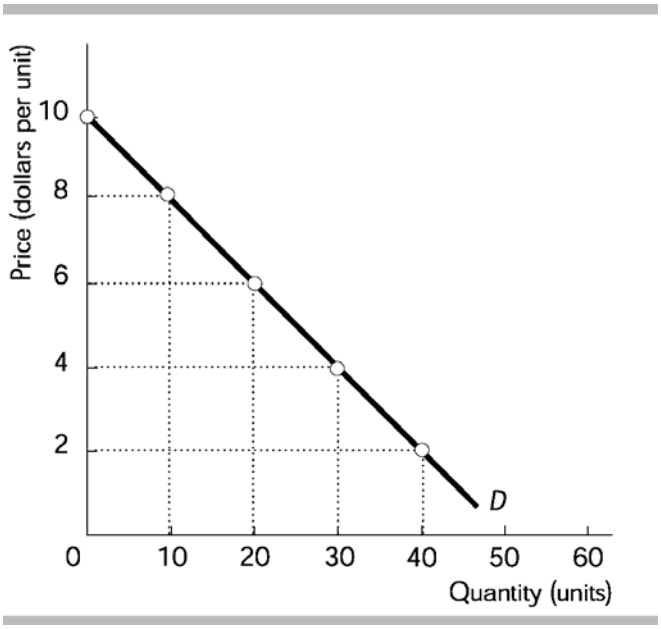
36) On a straight–line downward–sloping demand curve, the maximum elasticity of demand occurs 36) _____

A) where it intersects the supply curve. B) at its vertical intercept.

C) at its horizontal intercept. D) at its midpoint.

37) A straight–line demand curve with negative slope intersects the horizontal axis at 100 tons per week. At the midpoint on the demand curve (corresponding to 50 tons per week) the price elasticity of demand is 37) _____

A) greater than 1.0. B) 0.5. C) 1.0. D) 0.



38) The figure above illustrates a linear demand curve. By comparing the price elasticity in the $2 to $4 price range with the elasticity in the $8 to $10 range, you can conclude that the elasticity is _____ 38)

A) the same in both price ranges.

B) greater in the $8 to $10 range when the price rises but greater in the $2 to $4 range when the price falls.

C) greater in the $8 to $10 range.

D) greater in the $2 to $4 range.

39) The figure above illustrates a linear demand curve. If the price falls from $8 to $6, _____ 39)

A) the quantity demanded will increase by less than 20 percent.

B) total revenue will remain unchanged.

C) total revenue will increase.

D) total revenue will decrease.

40) The figure above illustrates a linear demand curve. In the range from $8 to $6, _____ 40)

A) the demand is unit elastic.

B) the demand is price inelastic.

C) the demand is price elastic.

D) more information is needed to determine if the demand is price elastic, unit elastic, or inelastic.

41) The figure above illustrates a linear demand curve. If the price falls from $6 to $4, _____ 41)

A) total revenue will decrease.

B) total revenue will increase.

C) quantity demanded will increase by more than 100 percent.

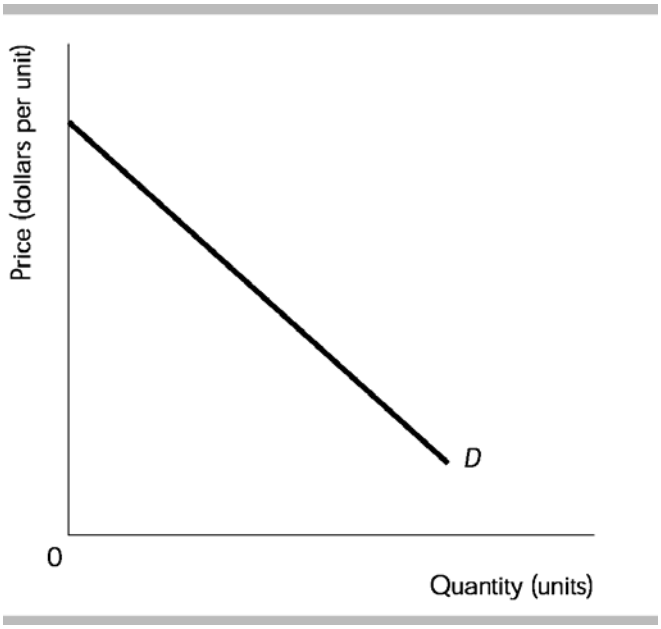
D) total revenue will remain unchanged.

42) The figure above illustrates a linear demand curve. In the price range from $8 to $6, demand is _____ and in the price range $4 to $2, demand is _____. 42) _____

A) elastic; inelastic
B) inelastic; inelastic
C) elastic; elastic
D) inelastic; elastic

43) The figure above illustrates a linear demand curve. If the price rises from $6 to $8 demand is _____ and if the price falls from $8 to $6 demand is _____. 43) _____

A) inelastic; inelastic
B) elastic; inelastic
C) elastic; elastic
D) inelastic; elastic



44) The demand curve in the figure above illustrates the demand for a product with 44) _____

A) zero price elasticity of demand at all prices.
B) a price elasticity of demand that is different at all prices.
C) unit price elasticity of demand at all prices.
D) infinite price elasticity of demand.

45) A straight-line demand curve with negative slope intersects the horizontal axis at 200 tons per week. The point on the demand curve at which the price elasticity of demand is 1 corresponds to a quantity demanded 45) _____

A) that would be negative if a negative quantity demanded were possible.
B) of 100 tons.
C) of 0 tons.
D) of 200 tons.

46) Demand is inelastic if 46) _____

A) a leftward shift of the supply curve raises the total revenue.

B) the good in question has close substitutes.

C) the smaller angle between the vertical axis and the demand curve is less than 45 degrees.

D) large shifts of the supply curve lead to only small changes in price.

47) Demand is unit elastic when 47) _____

A) a shift of the supply curve leads to no change in price.

B) the slope of the demand curve is –1.

C) a change in the price of the product leads to no change in the total revenue.

D) a shift of the supply curve leads to an equal shift of the demand curve.

48) Producers' total revenue will decrease if 48) _____

A) the price rises and demand is inelastic.

B) income increases and the good is a normal good.

C) the price rises and demand is elastic.

D) income falls and the good is an inferior good.

49) Producers' total revenue will increase if 49) _____

A) income falls and the good is a normal good.

B) the price rises and demand is inelastic.

C) the price rises and demand is elastic.

D) income increases and the good is an inferior good.

50) If the demand for a good is unit elastic, 50) _____

A) a 5 percent increase in price results in a 5 percent increase in total revenue.

B) the demand curve is a straight line with slope of –1.

C) a 5 percent increase in price results in a 5 percent decrease in total revenue.

D) a 5 percent increase in price does not change total revenue.

51) A shift of the supply curve of oil raises the price from $10 a barrel to $30 a barrel and reduces the quantity demanded from 40 million to 23 million barrels a day. You can conclude that the 51) _____

A) supply of oil is elastic. B) supply of oil is inelastic.

C) demand for oil is inelastic. D) demand for oil is elastic.

52) A shift of the supply curve of oil raises the price from $10 a barrel to $15 a barrel and reduces the quantity demanded from 40 million to 15 million barrels a day. You can conclude that the 52) _____

A) demand for oil is elastic. B) supply of oil is elastic.

C) supply of oil is inelastic. D) demand for oil is inelastic.

53) A leftward shift of the supply curve of cookies raises the price of a cookie from 10 cents to 20 cents and decreases the quantity demanded from 700,000 to 500,000. You can conclude that 53) _____

A) the supply of cookies is elastic. B) the supply of cookies is inelastic.

C) the demand for cookies is elastic. D) the demand for cookies is inelastic.

54) The demand for a good is elastic if 54) _____

A) a decrease in its price results in a decrease in total revenue.

B) the good is a necessity.

C) an increase in its price results in an increase in total revenue.

D) an increase in its price results in a decrease in total revenue.

55) If a price decrease results in your expenditure on a good decreasing, your demand must be 55) _____

A) unit. B) inelastic. C) linear. D) elastic.

56) An increase in subway fares in New York City will boost your expenditures on subway rides if 56) _____

A) the supply of subway rides is elastic. B) the supply of subway rides is inelastic.

C) your demand for subway rides is inelastic. D) your demand for subway rides is elastic.

57) The more substitutes available for a product, 57) _____

A) the larger is its income elasticity of demand.

B) the smaller is its income elasticity of demand.

C) the smaller is its price elasticity of demand.

D) the larger is its the price elasticity of demand.

58) Of the following, demand is likely to be the least elastic for 58) _____

A) Toyota automobiles. B) compact disc players.

C) Ford automobiles. D) toothpicks.

59) Of the following, demand is likely to be the least elastic for 59) _____

A) pink grapefruit. B) iceberg lettuce.

C) insulin for diabetics. D) diamonds.

60) The demand for food is most elastic in countries 60) _____

A) with low income levels. B) that are highly urbanized.

C) with intermediate income levels. D) with high income levels.

61) The demand for Honda Accords is 61) _____

A) probably inelastic and less elastic than the demand for automobiles.

B) probably elastic but less elastic than the demand for automobiles.

C) probably elastic and more elastic than the demand for automobiles.

D) probably inelastic but more elastic than the demand for automobiles.

62) The route from Dallas to Mexico City is served by more than one airline. The demand for tickets from American Airlines for that route is probably 62) _____

A) elastic and more elastic than the demand for all tickets for that route.

B) inelastic and less elastic than the demand for all tickets for that route.

C) elastic but less elastic than the demand for all tickets for that route.

D) inelastic but more elastic than the demand for all tickets for that route.

63) The elasticity of demand for Gateway computers is probably 63) _____

A) elastic and smaller than the elasticity of demand for computers overall.

B) inelastic and smaller than the elasticity of demand for computers overall.

C) inelastic but larger than the elasticity of demand for computers overall.

D) elastic and larger than the elasticity of demand for computers overall.

64) Aglets are the metal or plastic tips on shoelaces that make it easier to lace your shoes. The demand for aglets is probably 64) _____

A) perfectly elastic. B) inelastic.

C) elastic but not perfectly elastic. D) unit elastic.

65) The cross elasticity of demand measures the responsiveness of the quantity demanded of a particular good to changes in the prices of 65) _____

A) its complements but not its substitutes.

B) its substitutes but not its complements.

C) its substitutes and its complements.

D) neither its substitutes nor its complements.

66) If goods are complements, definitely their 66) _____

A) income elasticities are negative. B) income elasticities are positive.

C) cross elasticities are positive. D) cross elasticities are negative.

67) If a rise in the price of good 1 decreases the quantity of good 2 demanded, 67) _____

A) the cross elasticity of demand is negative. B) good 1 is an inferior good.

C) good 2 is an inferior good. D) the cross elasticity of demand is positive.

68) The cross elasticity of demand between apples and oranges is defined as 68) _____

A) the price elasticity of demand for apples divided by the price elasticity of demand for oranges.

B) the change in the quantity of apples demanded divided by the change in the quantity of oranges demanded.

C) the percentage change in the quantity of apples demanded divided by the percentage change in the price of oranges.

D) the percentage change in the quantity of apples demanded divided by the percentage change in the quantity of oranges demanded.

69) If the cross elasticity of demand between goods A and B is positive, 69) _____

A) the demands for A and B are both price elastic.

B) A and B are complements.

C) A and B are substitutes.

D) the demands for A and B are both price inelastic.

70) If the cross elasticity of demand between goods A and B is negative, 70) _____

A) the demands for A and B are both price elastic.

B) A and B are complements.

C) the demands for A and B are both price inelastic.

D) A and B are substitutes.

71) The greater the substitutability between Northwest timber and Southeast timber, the _____ is the cross elasticity of demand between timber from the two regions and the _____ is the elasticity of demand for Northwest timber. 71) _____

A) smaller; smaller B) larger; smaller C) smaller; larger D) larger; larger

72) If goods A and B are complements, 72) _____

A) the cross elasticity of demand between A and B is negative.

B) the cross elasticity of demand between A and B is positive.

C) their income elasticities of demand are both less than 1.

D) their income elasticities of demand are both greater than 1.

73) If a rise in the price of good B increases the quantity demanded of good A, 73) _____

A) B is a substitute for A, but A is a complement to B.

B) A is a substitute for B, but B is a complement to A.

C) A and B are complements.

D) A and B are substitutes.

74) If a fall in the price of good A increases the quantity demanded of good B, 74) _____

A) A and B are substitutes.

B) A and B are complements.

C) B is a substitute for A, but A is a complement to B.

D) A is a substitute for B, but B is a complement to A.

75) The cross elasticity of demand between Coca–Cola and Pepsi–Cola is 75) _____

A) positive, that is, Coke and Pepsi are complements.

B) negative, that is, Coke and Pepsi are complements.

C) positive, that is, Coke and Pepsi are substitutes.

D) negative, that is, Coke and Pepsi are substitutes.

76) A rise in the price of good A will shift the 76) _____

A) supply curve of good B rightward if the cross elasticity of demand between A and B is positive.

B) demand curve for good B rightward if the cross elasticity of demand between A and B is negative.

C) demand curve for good B rightward if the cross elasticity of demand between A and B is positive.

D) supply curve of good B rightward if the cross elasticity of demand between A and B is negative.

77) The income elasticity of demand is the percentage change in 77) _____

A) income divided by the percentage change in price.

B) the quantity demanded divided by the percentage change in income.

C) the price divided by the percentage change in income.

D) income divided by the percentage change in quantity demanded.

78) Demand is income elastic if 78) _____

A) an increase in income will not affect the quantity demanded.

B) a small percentage increase in income will result in a large percentage increase in quantity demanded.

C) the good in question has close substitutes.

D) a large percentage increase in income will result in a small percentage increase in quantity demanded.

79) The income elasticity of demand is high for 79) _____

A) shelter. B) luxuries. C) clothing. D) food.

80) To say that turnips are inferior goods means that the income elasticity 80) _____

A) is definitely greater than 1.

B) is negative.

C) is positive but could be greater than or less then (or equal to) 1.

D) is definitely between 0 and 1.

81) An increase in Abigail's income decreases her demand for cassette tapes. For her, cassette tapes are 81) _____

A) a complement to any good. B) a normal good.

C) an inferior good. D) a substitute good.

82) Goods whose income elasticities are negative are called 82) _____

A) superior goods. B) inferior goods. C) normal goods. D) complements.

83) A 10 percent increase in income has caused a 5 percent decrease in the quantity demanded. The income elasticity is 83) _____

A) 0.5. B) –2.0. C) 2.0. D) –0.5.

84) Deb's income has just risen from $950 per week to $1,050 per week. As a result, she decides to increase the number of movies she attends each month by 5 percent. Her demand for movies is 84) _____

A) income inelastic. B) income elastic.

C) represented by a vertical line. D) represented by a horizontal line.

85) Fred's income has just risen from $940 per week to $1,060 per week. As a result, he decides to purchase 9 percent more steak per week. The income elasticity of Fred's demand for steak is 85) _____

A) 0.75. B) 1.33. C) 0.90. D) 1.00.

86) Joan's income has just risen from $940 per week to $1,060 per week. As a result, she decides to purchase 12 percent more lettuce per week. The income elasticity of Joan's demand for lettuce is 86) _____

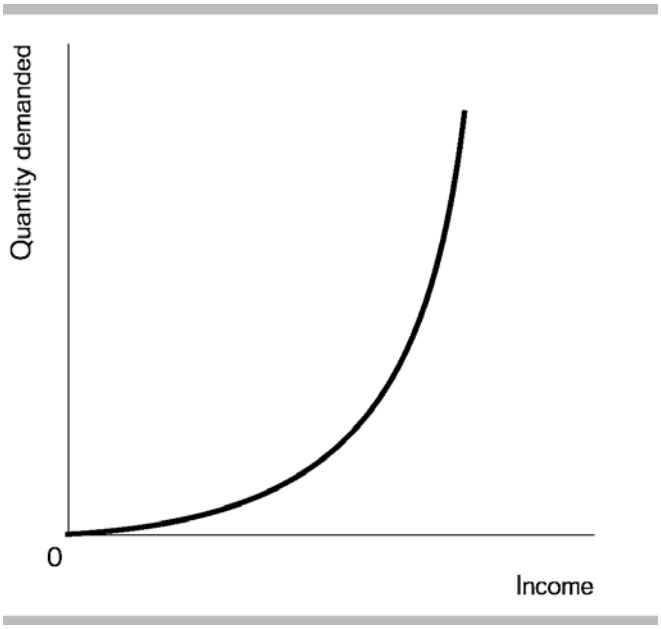
A) 1.33. B) 0.90. C) 1.00. D) 0.75.

87) A 10 percent increase in income causes the quantity of orange juice demanded to increase from 19,200 to 20,800 gallons. The income elasticity of demand for orange juice is 87) _____

A) 0.8. B) 1.2. C) 1.0. D) 0.5.

88) A 10 percent increase in income causes the quantity of apple juice demanded to increase from 18,800 to 21,200 gallons. The income elasticity of demand for apple juice is 88) _____

A) 0.5. B) 1.0. C) 1.2. D) 0.8.



89) The above figure shows a good 89) _____

A) that is an inferior good over all income ranges.

B) whose income elasticity is greater than 0 but less than 1.

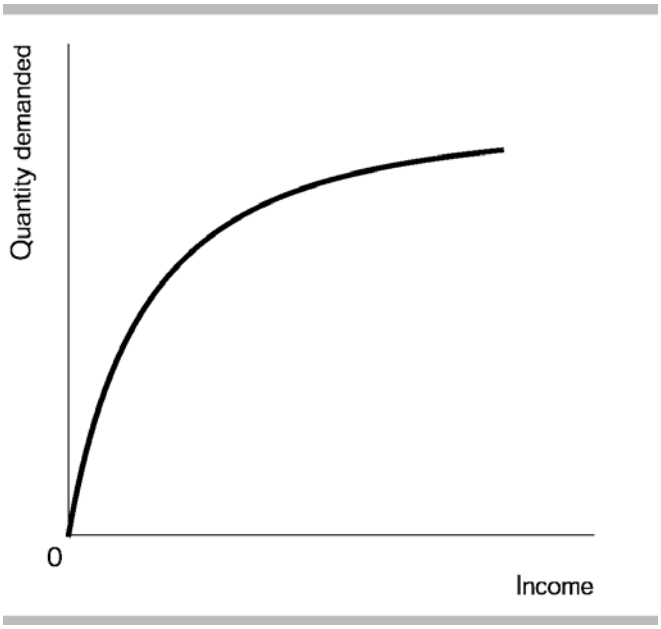
C) that is a normal good over some income ranges and an inferior good over other ranges.

D) whose income elasticity always exceeds 1.0.

90) Of the following, which one is most likely to have a negative income elasticity of demand? 90) _____

A) shoes B) tennis balls

C) inter-city bus travel D) frozen yogurt



91) The above figure shows a good 91) _____

A) whose income elasticity is greater than 0 but less than 1.

B) that is an inferior good over all income ranges.

C) whose income elasticity always exceeds 1.0.

D) that is a normal good over some income ranges and an inferior good over other ranges.

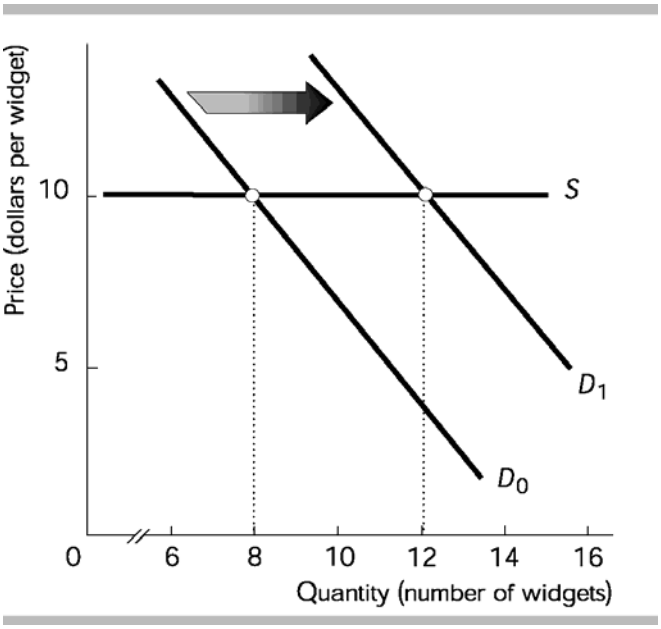
92) The above figure shows a good 92) _____

A) whose income elasticity always exceeds 1.0.

B) whose income elasticity is greater than 0 but less than 1.

C) that is an inferior good over all income ranges.

D) that is a normal good over some income ranges and an inferior good over other ranges.



93) The increase in the demand for widgets, shown in the figure above, is caused by an increase in the price of McBoover devices. Therefore, 93) _____

A) widgets and McBoover devices are substitutes.

B) widgets and McBoover devices are complements.

C) McBoover devices are a normal good.

D) widgets are a normal good.

94) The increase in the demand for widgets, shown in the figure above, is caused by a decrease in the price of McBoover devices. Therefore, 94) _____

A) widgets and McBoover devices are substitutes.

B) widgets are a normal good.

C) McBoover devices are a normal good.

D) widgets and McBoover devices are complements.

95) The increase in the demand for widgets, shown in the figure above, is caused by an increase in the price of McBoover devices from $9 to $11. Therefore, the cross–price elasticity for these two products is 95) _____

A) 0.5. B) –2.0. C) 2.0. D) –0.5.

96) The increase in the demand for widgets, shown in the figure above, is caused by a decrease in the price of McBoover devices from $11 to $9. Therefore, the cross–price elasticity for these two products is 96) _____

A) –2.0. B) 2.0. C) –0.5. D) 0.5.

97) The increase in the demand for widgets, shown in the figure above, is caused by an increase in average incomes. Therefore, widgets 97) _____

A) are a normal good. B) are elastically demanded.

C) are an inferior good. D) are inelastically demanded.

98) The increase in the demand for widgets, shown in the figure above, is caused by an increase in average incomes from $28,500 per year to $31,500 per year. Therefore, the income elasticity of demand for widgets is 98) _____

A) 4. B) 3/4. C) 1/4. D) 4/3.

99) As income rises, the share of income spent on food in the United States 99) _____

A) rises. B) remains constant at 15 percent.

C) falls. D) remains constant at 33 percent.

100) The elasticity of supply measures the responsiveness of 100) _____

A) quantity supplied to changes in price. B) quantity demanded to changes in supply.

C) quantity supplied to changes in income. D) quantity supplied to changes in demand.

101) The elasticity of supply measures the sensitivity of 101) _____

A) supply to changes in costs. B) quantity supplied to a change in price.

C) price to changes in supply. D) quantity supplied to quantity demanded.

102) On most days the price of a rose is $1 and 80 roses are purchased. On Valentine's Day the demand increases so that the price of a rose rises to $2 and 320 roses are purchased. Therefore, the price elasticity of 102) _____

A) demand for roses is about 1.8. B) supply of roses is about 1.8.

C) demand for roses is about 0.55. D) supply of roses is about 0.55.

103) Supply is elastic if 103) _____

A) a 1 percent change in price causes a larger percentage change in quantity supplied.

B) the good in question is a normal good.

C) the slope of the supply curve is positive.

D) a 1 percent change in price causes a smaller percentage change in quantity supplied.

104) If a 1 percent decrease in the price of a pound of oranges results in a smaller percentage decrease in the quantity supplied, 104) _____

A) supply is inelastic. B) demand is inelastic.

C) demand is elastic. D) supply is elastic.

105) If a 1 percent decrease in the price of a pound of squash results in a larger percentage decrease in the quantity supplied, 105) _____

A) demand is inelastic. B) demand is elastic.

C) supply is inelastic. D) supply is elastic.

106) If at a given moment, no matter what the price, producers cannot change the quantity supplied, the momentary supply 106) _____

A) has infinite elasticity. B) has unit elasticity.

C) does not exist. D) has zero elasticity.

107) If a rise in the price of oranges from $7 to $9 a bushel, caused by a shift of the demand curve, increases the quantity of bushels supplied from 4,500 to 5,500 bushels, the 107) _____

A) demand for oranges is elastic. B) supply of oranges is elastic.

C) demand for oranges is inelastic. D) supply of oranges is inelastic.

108) If a shift in the demand curve that raises the price of oranges from $7 to $9 a bushel increases the quantity of oranges supplied from 4,000 bushels to 6,000 bushels, the 108) _____

A) supply of oranges is elastic. B) supply of oranges is inelastic.

C) demand for oranges is inelastic. D) demand for oranges is elastic.

109) A rise in the price of cabbage from $14 to $18 per bushel, caused by a shift of the demand curve, increases the quantity supplied from 4,000 to 6,000 bushels. The elasticity of supply is 109) _____

A) 1.6. B) 1.0. C) 0.6. D) 0.8.

110) If a 5 percent increase in the price results in a 9 percent increase in quantity supplied, the elasticity of supply is 110) _____

A) 0.30. B) 0.55. C) 1.80. D) 1.20.

111) If a 5 percent increase in price results in a 3 percent increase in the quantity supplied, the elasticity of supply is 111) _____

A) 1.20. B) 0.60. C) 1.66. D) 0.30.

112) A vertical supply curve indicates an elasticity of supply that equals 112) _____

A) 0. B) infinity. C) 1. D) –1.

113) A horizontal supply curve indicates an elasticity of supply that equals 113) _____

A) 0. B) infinity. C) 1. D) –1.

114) Suppose a 10 percent increase in the price of textbooks decreases the quantity demanded by 20 percent. The elasticity of demand for textbooks is 114) _____

A) 0.2. B) 5.0. C) 10.0. D) 2.0.

115) The quantity of new cars increases by 10 percent. If the price elasticity of demand for new cars is 1.25, the price of new cars will fall by 115) _____

A) 8 percent. B) 10 percent. C) 2.5 percent. D) 12.5 percent.

116) Suppose the price elasticity of demand for oil is 0.1. In order to lower the price of oil by 20 percent, the quantity of oil supplied must be increased by 116) _____

A) 20 percent. B) 2 percent. C) 0.2 percent. D) 200 percent.

117) Moving up (to the left) along a linear demand curve, the price elasticity of demand 117) _____

A) at first increases and then decreases. B) increases.

C) decreases. D) does not change.

118) If the price elasticity of demand for a product equals 1, as its price rises the 118) _____

A) total revenue increases. B) quantity demanded does not change.

C) total revenue does not change. D) quantity demanded increases.

119) A rise in the price of a product lowers the total revenue from the product if the 119) _____

A) good is an inferior product.
B) demand for the product is inelastic.
C) demand for the product is elastic.
D) income elasticity of demand exceeds 1.

120) If a 4 percent rise in the price of peanut butter lowers the total revenue received by the producers of peanut butter by 4 percent, the demand for peanut butter 120) _____

A) is inelastic.
B) is elastic.
C) is unit elastic.
D) has an elasticity of 2.0.

121) A product is likely to have a price elasticity of demand that exceeds 1 when 121) _____

A) its price falls.
B) it is a necessity.
C) it has close substitutes.
D) the percentage of income spent on it decreases.

122) Which of the following is likely to have the smallest price elasticity of demand? 122) _____

A) a new Ford automobile
B) a new automobile
C) a new Ford Mustang
D) an automobile

123) A 10 percent decrease in the price of a Pepsi decreases the demand for a Coca-Cola by 50 percent. The cross elasticity of demand between a Pepsi and Coca-Cola is 123) _____

A) 5. B) 10. C) 0.20. D) 50.

124) A fall in the price of X from $12 to $8 causes an increase in the quantity of Y demanded from 900 to 1,100 units. What is the cross elasticity of demand between X and Y? 124) _____

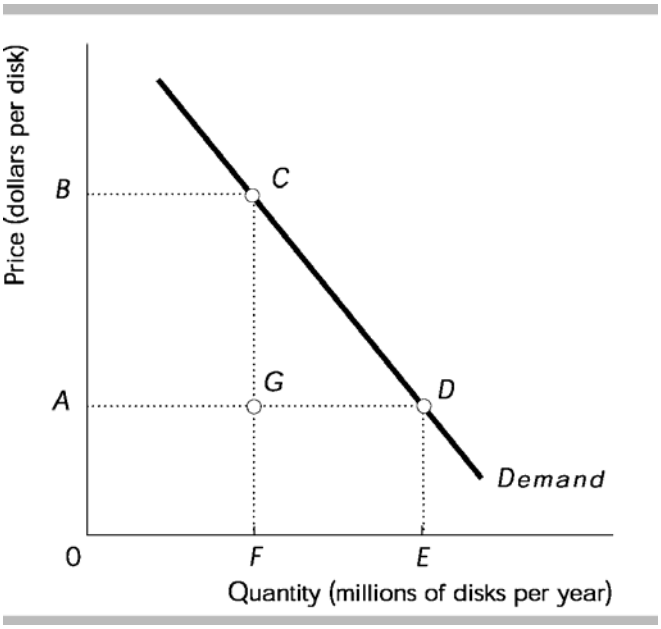
A) 2 B) -0.5 C) -2 D) 0.5

125) A fall in the price of X from $12 to $8 causes an increase in the quantity of Y demanded from 900 to 1,100 units. X and Y are 125) _____

A) complements. B) normal goods. C) substitutes. D) inferior goods.

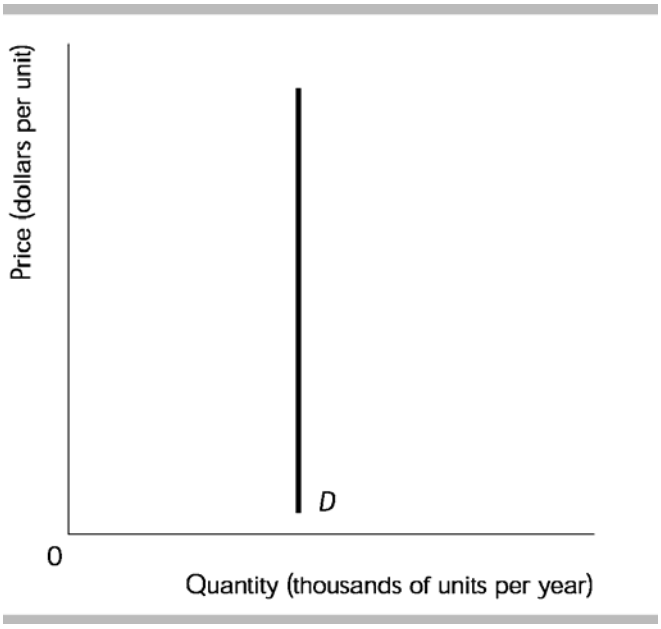
126) A 10 percent decrease in income decreases the quantity demanded of compact discs by 3 percent. The income elasticity of demand for compact discs is 126) _____

A) 10.0. B) 3.3. C) -0.3. D) 0.3.



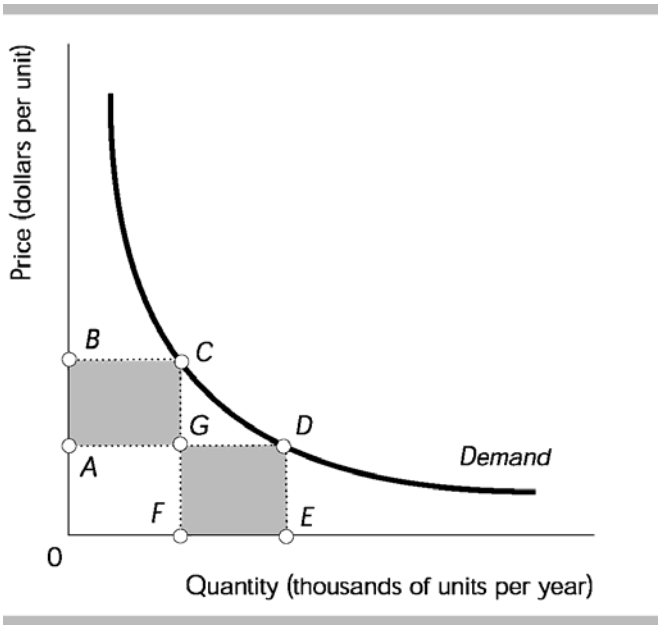
127) In the figure above, when the price of a disk is $*B*, total revenue is shown in the graph by area 127) _____

A) *FCDE*. B) *ADE*0. C) *AGF*0. D) *BCF*0.



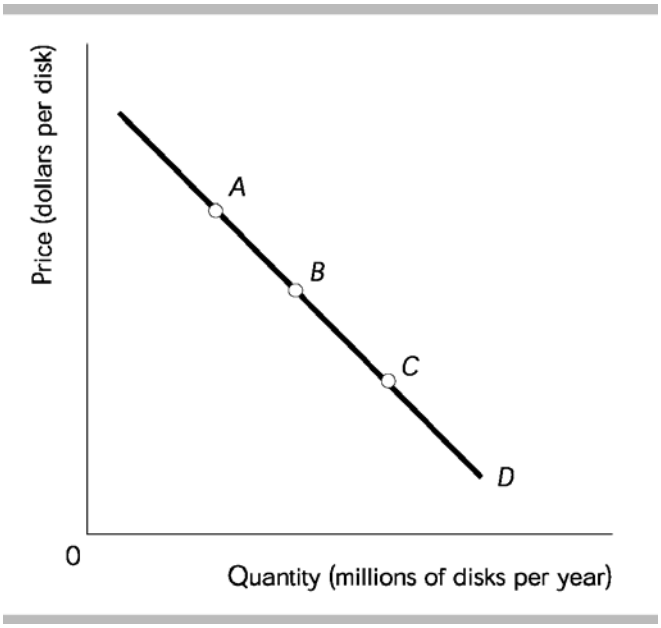
128) The above figure illustrates the demand curve for a good. The good has 128) _____

A) many substitutes.
B) no substitutes.
C) only one substitute.
D) only a few substitutes.



129) The elasticity of demand along the demand curve shown in the above figure is constant and equal to 1. Thus, 129) _____

A) area 0*BCF* equals area 0*AGF*.
B) area 0*BCF* equals area 0*ADE*.
C) area 0*BCF* equals area *FGDE*.
D) area *ABCG* equals area 0*AGF*.



130) The above figure shows a linear (straight-line) demand curve. Start at point *A* and then moving to point *B* and then point *C*, the price elasticity of demand 130) _____

A) increases.
B) increases and then decreases.
C) decreases and then increases.
D) decreases.

Answer Key
Testname: UNTITLED2.TST

1) B
2) D
3) C
4) B
5) A
6) A
7) A
8) A
9) A
10) D
11) A
12) C
13) B
14) B
15) D
16) C
17) B
18) C
19) D
20) A
21) A
22) B
23) C
24) A
25) D
26) C
27) D
28) D
29) C
30) C
31) C
32) B
33) A
34) C
35) A
36) B
37) C
38) C
39) C
40) C
41) D
42) A
43) C
44) B
45) B
46) A
47) C
48) C
49) B
50) D

51) C
52) A
53) D
54) D
55) B
56) C
57) D
58) D
59) C
60) A
61) C
62) A
63) D
64) B
65) C
66) D
67) A
68) C
69) C
70) B
71) D
72) A
73) D
74) B
75) C
76) C
77) B
78) B
79) B
80) B
81) C
82) B
83) D
84) A
85) A
86) C
87) A
88) C
89) D
90) C
91) A
92) D
93) A
94) D
95) C
96) A
97) A
98) A
99) C
100) A

Answer Key
Testname: UNTITLED2.TST

101) B
102) B
103) A
104) A
105) D
106) D
107) D
108) A
109) A
110) C
111) B
112) A
113) B
114) D
115) A
116) B
117) B
118) C
119) C
120) B
121) C
122) D
123) A
124) B
125) A
126) D
127) D
128) B
129) B
130) D

Unit: I[st] introduction

Q. Scarcity means we all have to make choices?

Ans. It refers to the situation when what you have is less than what you wish to have. In other words "scarcity" implies a situation when supply of resources is less than the demand for resources. Due to the existence of limited resources and unlimited wants, the scarcity automatically comes into picture. In short scarcity is function of limited resources and unlimited wants. Economic resources are predominantly scarce in nature with divergent types like land, labour, capital and entrepreneurship. In presence of limited economic resources with alternative uses every economy has to face the problems like what to produce, how to produce, for whom to produce and how to achieve economic growth and development.Because of scarcity, **choices** have to be made by consumers, businesses and governments. For example, over six million people travel into London each day and they make choices about when to travel, whether to use the bus, the tube, to walk or cycle – or whether to work forwhom.

Q. Explain production possibility curve with the help of diagram?

Ans.A production possibility curve shows all the possible combinations of two goods that a society can produce within a specified time period when the resources are fully (efficiently) utilised. In other words, production possibility curve is the locus of all combinations of two goods that can be produced with the given resources. PPC is also known as Production Possibility Frontier (PPF) because it shows limit of what is possible to produce. Along a PPC if we want to increase the production of one commodity then we have to reduce the production of another commodity. This is why Production possibility Curve is also known as transformation curve. Choices (alternatives) can be explained with the help of a production possibility curve. Production possibility curve is also called opportunity cost curve because slope of the curve at each and every point measures opportunity cost of one commodity in terms of alternative commodity given up. The rate of this sacrifice is called the marginal opportunity cost of the expanding good.

Assumptions: The basic assumptions of production possibility curve are as follows:

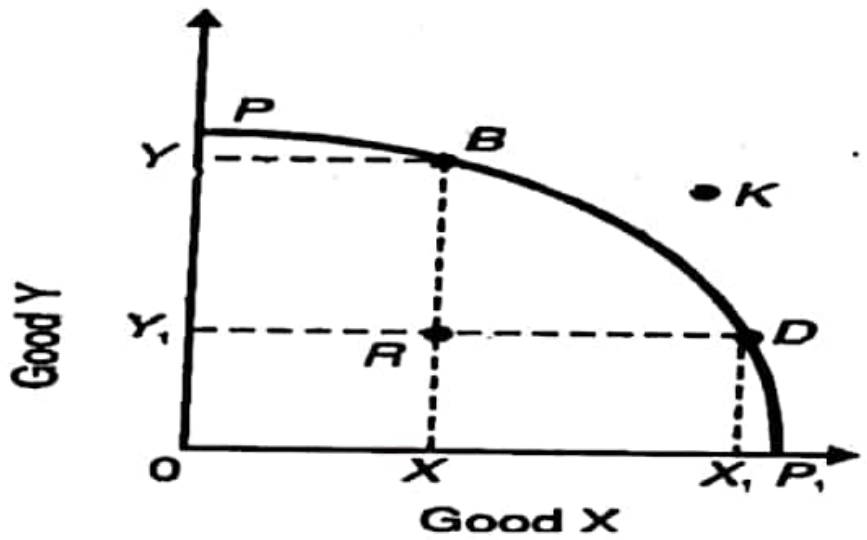
1. The economy uses fixed quantity of resources. These resources are transferable from one use to another.

2. The level of technology remains constant.

3. Only two commodities are produced at a time in the economy.

4. There is full employment in the economy, i e, resources are being used fully.

PPC is further explained with the help of following diagram. Here for the sake of simplicity we assume that only two goods X and Y are produced with given resources and technique of production. In the figure PP1 is the production possibility curve (fig.2.1) which shows the problem of choice between two goods X and Y in a country. Good X is measured on the horizontal axis and Good Y on the vertical axis. PP1 curve shows all the combinations of X and Y that can be produced with the available resources. If the entire resources are used in the production of Y, the economy can produce OP quantity of Y and if the entire resources are used in the production of X, the society can produce O P1 quantity of X. Point B represents OY quantity of Y and OX quantity of X. If the economy chooses to produce more of X, it would have to sacrifice the production of some quantity of Y. The sacrifice of some quantity of Y is the opportunity cost of producing some more quantity of X. The PP1 curve is downward slopping because production of more X, involves production of less Y. Any point inside the PPC such as R shows inefficient utilization or under utilization of resources. Point K is unattainable combination. In other words, economy cannot produce this combination with the given resources and technology.



Properties: Two basic properties of production possibility curve are;

1) Production possibility curve slopes down words. The down word slope or negative slope of production possibility curve shows that if more of one good is to be produced then less of another good will be produced.

2) Production possibility curve is concave to the point of origin. The concave slope shows that more and more units of one commodity shall have to be sacrificed to produce additional units of another commodity.

Q. How does PPC explain the central problems?

Ans. The PPC helps in explaining the central problems of What, How and for whom to produce in the following manner.

1) This curve helps in solving the basic problems of economy. A point on production possibility curve indicates as to what goods we produce and in how much quantity.

2) How production is being done, can also be known with the help of this curve. If production is not being done properly then the economy will operate at a point inside PPC. If production is being done properly economy can operate at a point on PPC. This means proper utilization of resources.

3) PPC also explains for whom goods are being produced. If more luxury goods are being produced then production is meant for rich. If necessaries are produced then production is meant for common people.

Q. What do you mean by Opportunity Cost?

Ans. Opportunity cost refers to the value of a factor in its next best alternative use. Let us suppose on a given piece of land either rice or wheat can be grown. On this piece if rice is grown, its yield will be 10 tones. On the other hand, if wheat is grown its yield will be 8 tones. If rice is grown wheat cannot be grown. In other words, we forgo wheat for rice. Therefore opportunity cost of 10 tons of rice is 8 tones 0f wheat.

Q. Define marginal opportunity cost?

Ans. Marginal opportunity cost is also known as marginal rate of transformation (MRT). It can be defined as the ratio of number of units of a good sacrificed to produce an additional unit of another good. In other words marginal opportunity cost is the opportunity cost of the good that is additionally produced. Marginal opportunity cost can be understood with the following schedule.

CTV sets (in, 000) X	Computers (in,00) Y	Marginal opportunity cost.
0	20	-
I	18	2
2	15	3
3	11	4
4	6	5
5	0	6

The above schedule is showing the marginal opportunity cost of CTV, s. For getting one thousand of CTV sets we have to sacrifice some units of computers. For instance, if we want to produce 2 thousand sets of CTV, we will have to sacrifice or pay the cost of 3 hundred of computers and so on.

Marginal opportunity cost= $\frac{Unitofonegoodsacrificed}{Moreunitsofothergoodproduced}$ *or*

$$\textbf{MarginalopportunityCost} = \frac{\Delta Y}{\Delta X}$$

Choice and opportunity cost: Choiceand*opportunity cost* are two fundamental concepts in economics. Given that resources are limited, producers and consumers have to make choices between competing alternatives. All economic decisions involve making choices. Individuals must choose how best to use their skill and effort, firms must choose how best to use their workers and machinery, and governments must choose how best to use taxpayer's money. Making an economic choice creates a sacrifice because alternatives must be given up, which results in the loss of benefit that the alternative would have provided. For example, if an individual has £10 to spend, and if books are £10 each and downloaded music tracks are £1 each, buying a book means the loss of the benefit that would have been gained from the 10 downloaded tracks. Similarly, land and other resources, which have been used to build a new school could have been used to build a new factory. The loss of the *next best* option represents the real sacrifice and is referred to as *opportunity cost.* The opportunity cost of choosing the school is the loss of the factory, and what could have been produced.

It is necessary to appreciate that opportunity cost relates to the loss of the next best alternative, and not just any alternative. The true cost of any decision is always the closest option not chosen.

Features.

Production Function.

Production is the result of co-operation of four factors of production viz., land, labour, capital and organization.

This is evident from the fact that no single commodity can be produced without the help of any one of these four factors of production.

Therefore, the producer combines all the four factors of production in a technical proportion. The aim of the producer is to maximize his profit. For this sake, he decides to maximize the production at minimum cost by means of the best combination of factors of production.

The producer secures the best combination by applying the principles of equi-marginal returns and substitution. According to the principle of equi-marginal returns, any producer can have maximum production only when the marginal returns of all the factors of production are equal to one another. For instance, when the marginal product of the land is equal to that of labour, capital and organisation, the production becomes maximum.

Meaning of Production Function:

In simple words, production function refers to the functional relationship between the quantity of a good produced (output) and factors of production (inputs).

"The production function is purely a technical relation which connects factor inputs and output." Prof. Koutsoyiannis

Production function is "the relation between a firm's physical production (output) and the material factors of production (inputs)" - Prof. Watson.

In this way, production function reflects how much output we can expect if we have so much of land and so much of capital as well as of labour etc. In other words, we can say that production function is an indicator of the physical relationship between the inputs and output of a firm.

The reason behind physical relationship is that money prices do not appear in it. However, here one thing that becomes most important to quote is that like demand function a production function is for a definite period.

It shows the flow of inputs resulting into a flow of output during some time. The production function of a firm depends on the state of technology. With every development in technology the production function of the firm undergoes a change.

The new production function brought about by developing technology displays same inputs and more output or the same output with lesser inputs. Sometimes a new production function of the firm may be adverse as it takes more inputs to produce the same output.

Mathematically, such a basic relationship between inputs and outputs may be expressed as:

$Q = f(L, C, N)$

Where Q = Quantity of output

L = Labour

C = Capital

2. Complementarity:

The factors of production are also complementary to one another, that is, the two or more inputs are to be used together as nothing will be produced if the quantity of either of the inputs used in the production process is zero.

The principles of returns to scale is another manifestation of complementarity of inputs as it reveals that the quantity of all inputs are to be increased simultaneously in order to attain a higher scale of total output.

3. Specificity:

It reveals that the inputs are specific to the production of a particular product. Machines and equipment's, specialized workers and raw materials are a few examples of the specificity of factors of production. The specificity may not be complete as factors may be used for production of other commodities too. This reveals that in the production process none of the factors can be ignored and in some cases ignorance to even slightest extent is not possible if the factors are perfectly specific.

Production involves time; hence, the way the inputs are combined is determined to a large extent by the time period under consideration. The greater the time period, the greater the freedom the producer has to vary the quantities of various inputs used in the production process.

In the production function, variation in total output by varying the quantities of all inputs is possible only in the long run whereas the variation in total output by varying the quantity of single input may be possible even in the short run.

Long run production function – In microeconomics, the **long run** is the conceptual time period in which there are no fixed factors of production, so that there are no constraints preventing changing the output level by changing the capital stock or by entering or leaving an industry. **Long run** refers to the period of time over which it is possible to vary the inputs of all factors of production. Thus in the **long run** all the factors of production becomes variable.

Short run production function- Short run refers to the period of time over which some factors are variable and others are fixed, constraining entry or exit from an industry.

Physical Production : Total Product, Average Product and Marginal Product.

The three concepts of regarding physical production are: (1) Total Product (2) Average Product (3) Marginal Product.

1. Total Product:

Total product of a factor is the amount of total output produced by a given amount of the factor, other factors held constant. As the amount of a factor increases, the total output increases. It will be seen from Table 1.1 that when with a fixed quantity of capital (K), more units of labour are employed total product is increasing in the beginning.

Table 1.1

Units of Labour	*Total Product (Quintals)*	*Marginal Product (Quintals)*	*Average Product (Quintals)*
L	Q	$\frac{\Delta Q}{\Delta L}$	$\frac{Q}{L}$
1	80	80	80
2	170	90	85
3	270	100	90
4	368	98	92
5	430	62	86
6	480	50	80
7	504	24	72
8	504	0	63
9	495	–9	55
10	480	–15	48

Thus, when one unit of labour is used with a given quantity of capital 80 units of output are produced. With two units of labour 170 units of output are produced, and with three units of labour total product of labour increases to 270 units and so on.

After 8 units of employment of labour total output declines with further increase in labour input. But the rate of increase in total product varies at different levels of employment of a factor. Graphically the total product curve is shown by TP curve in Fig.1.1. It will be seen that in the beginning total product curve rises at an increasing rate, that is, the slope of the TP curve is rising in the beginning.

After a point total product curve starts rising at a diminishing rate as the employment of the variable factor is increased.

2. Average Product:

Average product of a factor is the total output produced per unit of the factor employed. Thus,

Average Product = Total Product/Number of units of a factor employed

If Q stands for total product, L for the number of a variable factor employed, then average product (AP) is given by:

AP = Q/L

We can measure the average product from the total product data given in Table 1.1. Thus when two units of labour are employed, the

average product is Q/L = 170/2 = 85. Similarly, when three units of labour are employed, average product is 270/3 = 90 and so on.

From a total product curve TP in Fig. 1.1, we can measure the average product of labour. Thus, when OL_1 units of labour are employed, total product is equal to L_1A and therefore average product of labour equals L_1A/OL_1 which would be equal to the slope of the ray OA. Similarly, when OL2 units of labour are employed, total product (TP) is L_2B which would give us average product to be equal to L_2B/OL_2 the slope of the ray OB. Further with the employment of labour equal to OL_3 the average product will be measured by the slope of the ray OC.

It has been generally found that as more units of a factor are employed for producing a commodity, the average product first rises and then falls. As shall be seen from Table 1.1 and the Fig. 1.1, the average product curve of a variable factor first rises and then it declines. That is, the average product curve has an inverted U-shape.

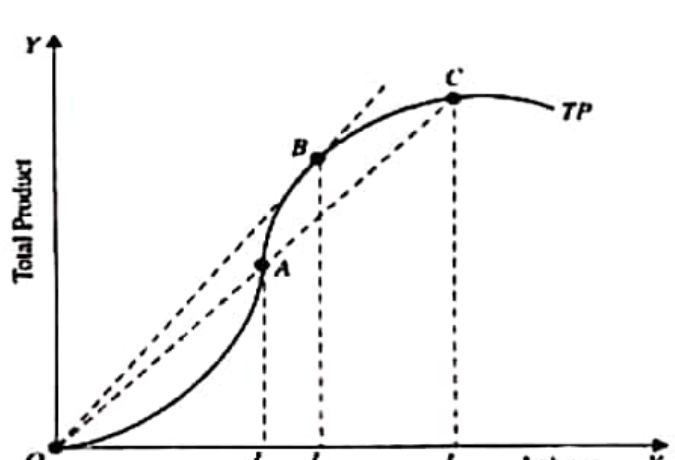


Fig 1.1.Measuring Average Producton a total Production function curve

Marginal product of a factor is the addition to the total production by the employment of an extra unit of a factor. Suppose when two workers are employed to produce wheat in an agricultural farm and they produce 170 quintals of wheat per year.

Now, if instead of two workers, three workers are employed and as a result total product increases to 270 quintals, then the third worker has added 100 quintals of wheat to the total production. Thus 100 quintals is the marginal product of the third worker.

It will be seen from Table 1.1 that marginal product of labour increases in the beginning and then diminishes. Marginal product of 8th unit of labour is zero and beyond that it becomes negative

Mathematically, if employment of labour increases by ΔL units which yield an increase in total output by ΔQ units, the marginal physical product of labour is given by $\Delta Q/\Delta L$. That is,

$MP_L = \Delta Q/\Delta L$

The marginal physical product curve of a variable factor can also be derived from the total physical product curve of labour. At any given level of employment of labour, the marginal product of labour can be obtained by measuring the slope of the total product curve at a given level of labour employment. For example, in Fig. 1.2 when OL_1 units of labour are employed, the marginal physical product of

labour is given by the slope of the tangent drawn at point A to the total product curve TP.

Again, when OL_2 units of labour are employed, the marginal physical product of labour is obtained by measuring the slope of the tangent drawn to the total product curve TP at point B which corresponds to OL_2 level of labour employment and so on for further units of labour employed.

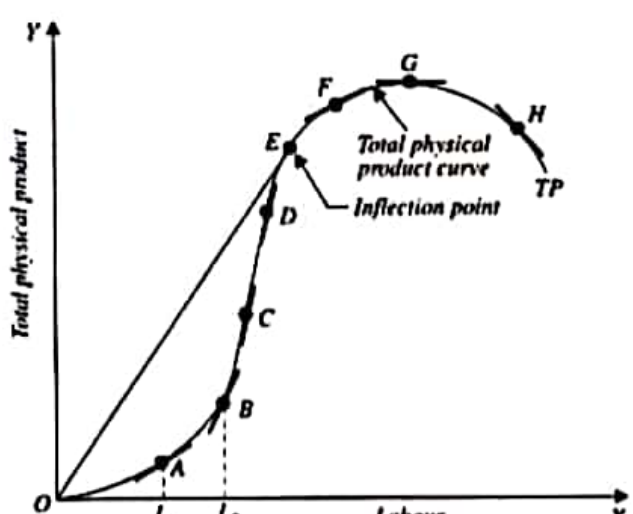


Fig 1.2.Measuring Marginal Physical Product of Labour.

The marginal product of a factor will change at different levels of employment of the factor. It has been found that marginal product of a factor rises in the beginning and then ultimately falls as more of it is used for production, other factors remaining the same.

That is why in Fig. 1.2 marginal product (MP) of labour as measured by the slopes of the tangents drawn to the total product curve TP at various points has been shown to be rising in the

That is why in Fig. 1.2 marginal product (MP) of labour as measured by the slopes of the tangents drawn to the total product curve TP at various points has been shown to be rising in the

beginning and then diminishing till it becomes zero at the maximum point G of the total product curve.

Thereafter, the marginal product of labour becomes negative. The relationship between average product and marginal product and how both of them are related to the total product will be explained in detail in our analysis of the law of variable proportions.

REVENUE CONCEPTS.

Profit making is considered to be the most important objective of firm. Like the consumers aim at utility maximisation, the producers aim at the profit maximisation. Profit is a difference between total cost and total revenue.Profit can be increased either by reducing the cost of production or by increasing the revenue.

Meaning of Revenue:

The amount of money that a producer receives in exchange for the sale proceeds is known as revenue. For example, if a firm gets Rs. 16,000 from sale of 100 chairs, then the amount of Rs. 16,000 is known as revenue.

Revenue refers to the amount received by a firm from the sale of a given quantity of a commodity in the market.

Revenue is a very important concept in economic analysis. It is directly influenced by sales level, i.e., as sales increases, revenue also increases.

Concept of Revenue:

The concept of revenue consists of three important terms; Total Revenue, Average Revenue and Marginal Revenue.

Total Revenue

The total revenue of a firm is the total amount of money that the firm receives by selling a certain quantity of output. Symbolically,

$TR = P \times Q$

Where,

P = Price

Q = Quantity

TR = Total Revenue

Example:

Calculate the total revenue for a firm which is selling 10 television sets at Rs. 21,000 each.

$TR = P \times Q$

$= 21,000 \times 100$

$= Rs.\ 2,10,000$

Average Revenue

Revenue earned by a firm per unit of output is called average revenue. Average revenue is equal to price in both competitive and non-competitive markets. Symbolically,

$AR = TR/Q$

Where

AR = Average Revenue

TR = Total Revenue

Q = Units sold

Example:

What is the average revenue for a firm which is selling 25 units of commodity X and getting the total revenue of Rs. 2000?

AR = TR/Q

= 2000/25

= 80

Marginal Revenue

Revenue earned by selling additional unit of output is called as marginal revenue. In other words, change in the revenue resulting from a one unit increase in output is marginal revenue. Symbolically,

$MR = TR_n - TR_{n-1}$

Where

MR = Marginal Revenue

TR = Total Revenue

n = Unit sold

Example :

By selling 20 units, Firm ABC earned Rs. 200. After selling the 21st unit, firm's revenue increased to 218. What is the marginal revenue in this case?

$MR = TR_n - TR_{n-1}$

= Total revenue by selling 21(n) units - total revenue by selling 20(n-1) units

= 218 - 200 = 18

•

The Relationship between Different Revenue Concepts:

The relationship between different revenue concepts can be discussed under two situations:

(i) When Price remains Constant (It happens under Perfect Competition). In this situation, firm has to accept the same price as determined by the industry. It means, any quantity of a commodity can be sold at that particular price.

(ii) When Price Falls with rise in output (It happens under Imperfect Competition). In this situation, firm follows its own pricing policy. However, it can increase sales only by reducing the price.

Let us now discuss the relationship between different revenue concepts, when: (i) When Price remains constant; (ii) When Price Falls with rise in output.

Relationship between AR and MR (When Price remains Constant):

When price remains same at all output levels (like in case of perfect competition), no firm is in a position to influence the market price of the product. A firm can sell more quantity of output at the same price (see Table 1). It means, the revenue from every additional unit (MR) is equal to AR. As a result, both AR and MR curves coincide in a horizontal straight line parallel to the X-axis as shown in Fig 1.

Table1: AR and MR (When Price remains Constant):

Units sold	**Price/AR** (Rs.)	**TR** (Rs.)	**MR**(Rs.)
1	5	5	5
2	5	10	5
3	5	15	5
4	5	20	5
5	5	25	5

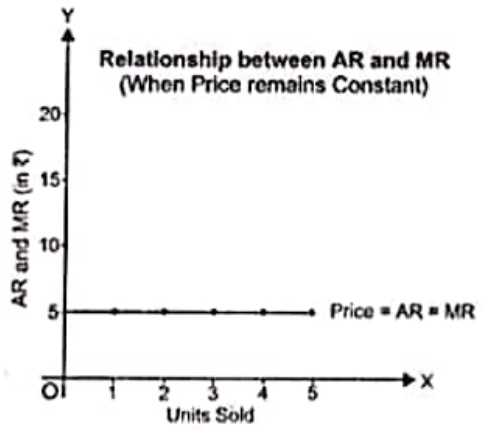


Fig 1

As seen in the given schedule and diagram, price (AR) remains same at all level of output and is equal to MR. As a result, demand curve (or AR curve) is perfectly elastic.

Always remember that when a firm is able to sell more output at the same price, then AR = MR at all levels of output.

Relationship between TR and MR (When Price remains Constant):

When price remains constant, firms can sell any quantity of output at the price fixed by the market. As a result, MR curve (and AR curve) is a horizontal straight line parallel to the X-axis. Since MR remains constant, TR also increases at a constant rate (see Table 2). Due to this reason, the TR curve is a positively sloped straight line (see Fig. 2)As TR is zero at zero level of output, the TR curve starts from the origin.

Table 2: TR and MR (When Price remains Constant):

Units sold	Price/AR (Rs.)	TR (Rs.)	MR (Rs.)
1	5	5	5
2	5	10	5
3	5	15	5
4	5	20	5
5	5	25	5

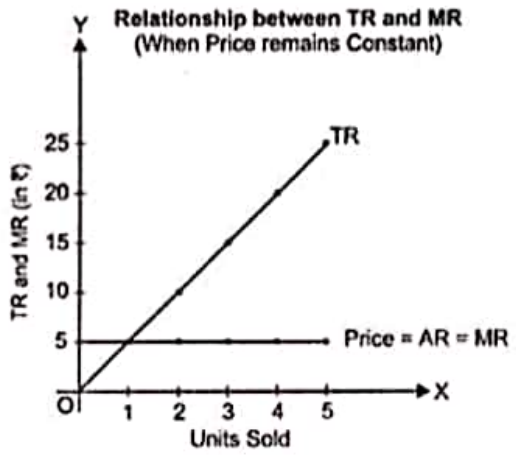


Fig 2

Relationship between TR and Price line:

When price remains constant at all the levels of output, then Price = AR = MR. Therefore, price line is the same as MR curve. Also, TR = I MR. So, the area under MR curve or price line will be equal to TR. In Fig. 3, TR at MR level of output = OP x OQ = Area under price line.

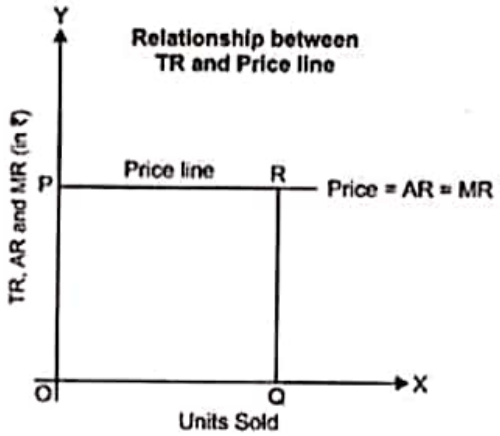


Fig 3

Relationship between AR and MR (When Price Falls with rise in output):

When firms can increase their volume of sales only by decreasing the price, then AR falls with increase in sale. It means, revenue from every additional unit (i.e. MR) will be less than AR. As a result, both AR and MR curves slope downwards from left to right. This relationship can be better understood through Table 3 and Fig. 4:

Table 3: AR and MR (When Price Falls with rise in output):

Units Sold	AR (Rs.)	TR (Rs.)	MR (Rs.)	Ratio of Fall (AR: MR)
1	5	5	5	—
2	4	8	3	1 :2
3	3	9	1	1 :2
4	2	8	-1	1 :2
5	1	5	-3	1 :2

In Table 3 , both MR and AR fall with increase in output. However, fall in MR is double than that in AR, i.e., MR falls at a rate which is

twice the rate of fall in AR. As a result, MR curve is steeper than the AR curve because MR is limited to one unit, whereas, AR is derived by all the units. It leads to comparatively lesser fall in AR than fall in MR.

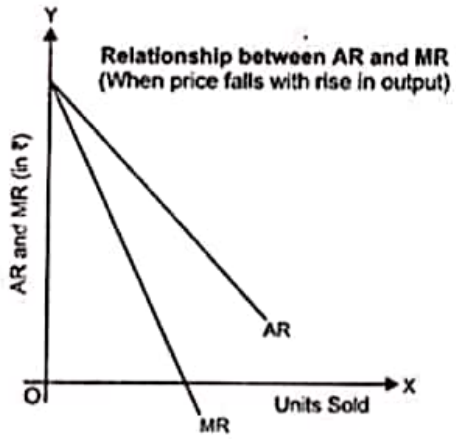


Fig 4

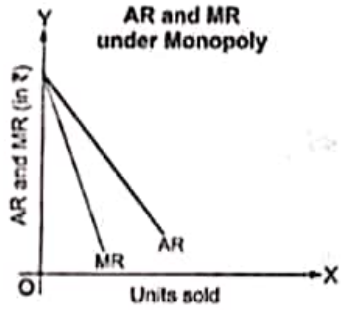
It must be noted that MR can fall to zero and can even become negative. However, AR can be neither zero nor negative as TR it is always positive.

AR and MR Curves under Monopoly and Monopolistic Competition:

Both, Monopoly and Monopolistic Competition fall under the category of Imperfect Competition. Therefore, AR and MR curves slope downwards as more units can be sold only by reducing the price. However, there is one major difference between AR and MR curves of monopoly and monopolistic competition.

Under monopolistic competition, the AR and MR curves are more elastic as compared to those of Monopoly. It happens because of the presence of close substitutes under monopolistic competition and absence of close substitutes under monopoly. So, when price

of a commodity is increased in both the markets, then proportionate fall in demand under monopoly is less than proportionate fall in demand under monopolistic competition.



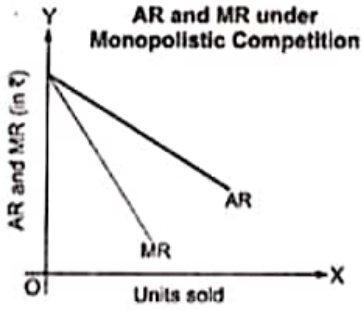


Fig 5 **Fig 6**

Relationship between TR and MR (When Price Falls with rise in output):

When more of output can be sold only by lowering the price, then revenue from every additional unit (i.e. MR) will fall. MR is the addition to TR when one more unit of output is sold. So, TR will increase when MR is positive, TR will fall when MR is negative and TR will be maximum when MR is zero. This relationship can be better understood with the help of Table 4 and Fig. 7:

Table 4: TR and MR (When Price Falls with rise in output):

Units sold	AR (Rs.)	TR (Rs.)	MR (Rs.)
1	5	5	5
2	4	8	3
3	3	9	1
4	2.25	9	0
5	1	5	-4

In Fig. 7, the TR curve rises as long as MR is positive. It reaches its highest point (point A) when MR is zero (point B) and it starts declining when MR becomes negative.

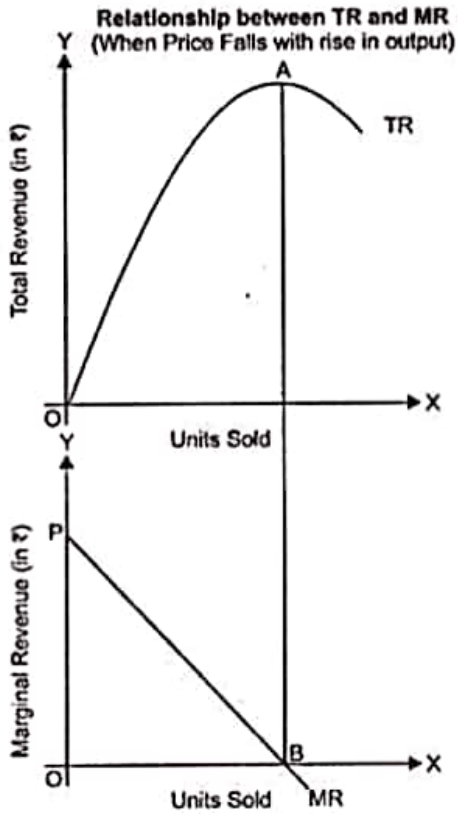


Fig 7

The relationship can be summed up as under:

1. As long as MR is positive, TR increases (or when TR rises, MR is positive).

2. When MR is zero, TR is at its maximum point (or when TR is maximum, MR is zero).

3. When MR becomes negative, TR starts falling (or when TR falls,